MAY
1948

PESTS

and their CONTROL

Thomas E. Snyder and Ira Hatfield, wood-infesting insect authorities meet PCOs at Purdue (See page 12)

MAGAZINE OF THE PEST CONTROL INDUSTRY

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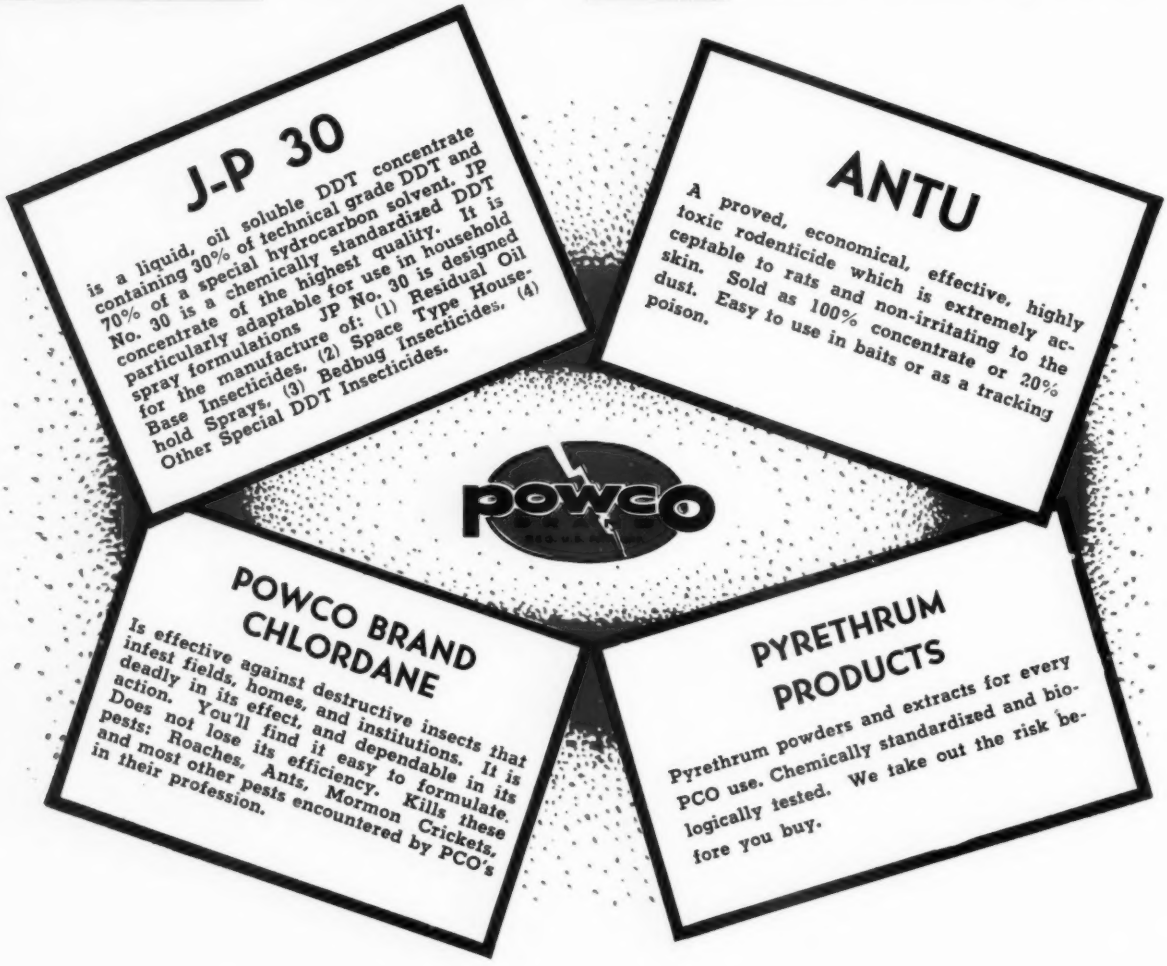
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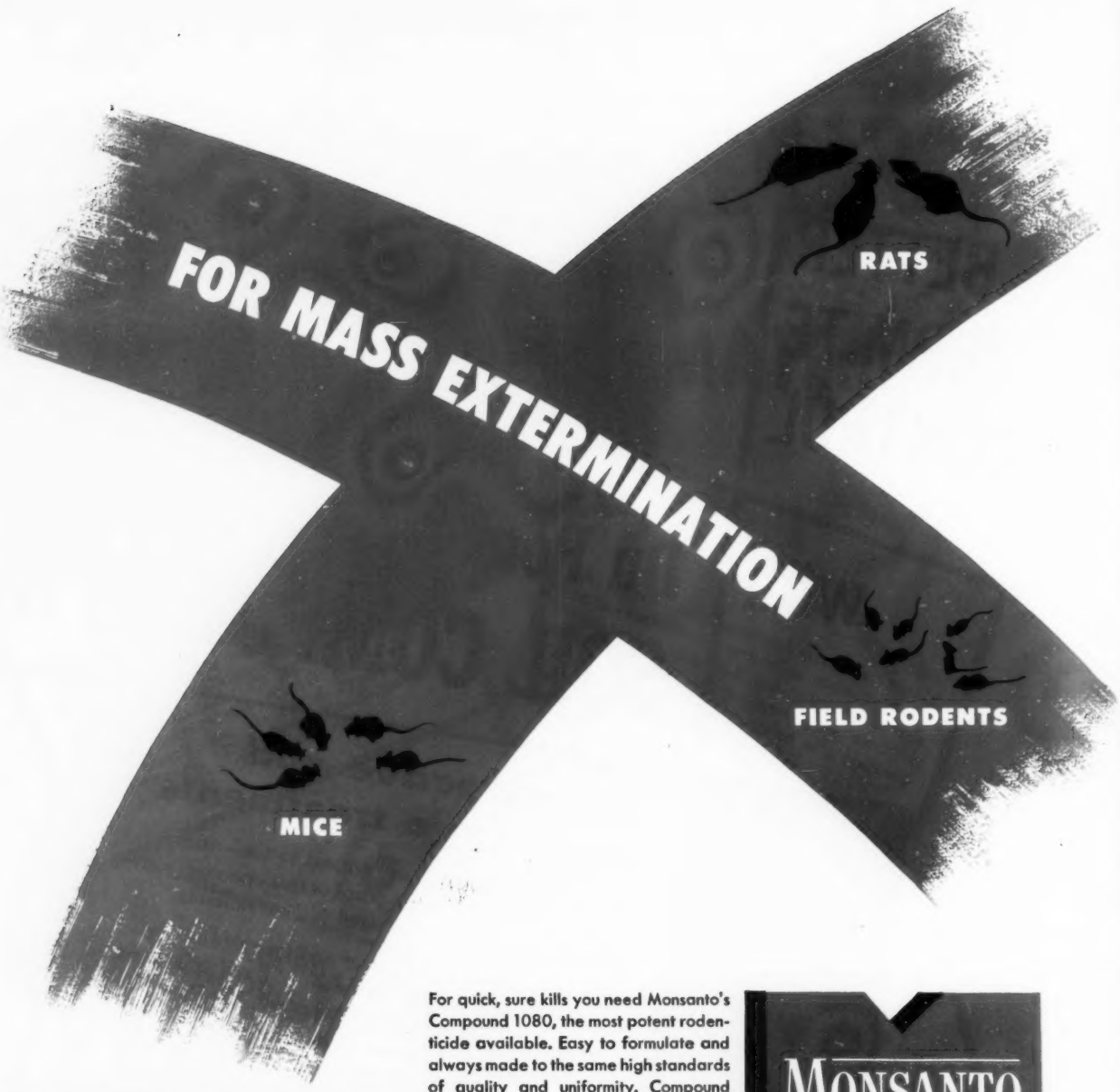

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PESTS and their CONTROL

MAY, 1948 Vol. 16, No. 5

JAMES A. NELSON
Editor

Cooperating with

NATIONAL PEST CONTROL ASSOCIATION

Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of material pertaining to pest control and pests from those interested in the advancement of the field.

All contributions must be in our hands by the 15th of the month preceding issue for which they are intended.

EDITORIAL and BUSINESS OFFICES

1900 Euclid Building

Cleveland 15, Ohio

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PESTS AND THEIR CONTROL is published monthly by Trade Magazines, Inc., 1900 Euclid Bldg., Cleveland 15, Ohio. Office of Publication, 324 North State St., Painesville, Ohio. Entered as Second Class Matter November 15, 1945, at the post office in Kansas City, Mo. under the Act of March 3, 1879. Application for entry as second-class matter at Post Office at Painesville, Ohio pending. **Subscription Rates:** 1 year, $4.00; 2 years, $7.00. Countries outside of the United States, including Canada, 1 year, $4.00; 2 years $7.50; 3 years, $10.00. **Change of Address:** Three weeks advance notice is necessary for change of address. Both old and new address must be given. **Advertising Copy:** Final forms close 15th of preceding month. If proofs are desired, copy must be in our hands by 10th of preceding month. Copy and insertion orders to be sent to our Cleveland address. Advertising cuts should be sent to Painesville Publishing Co., 324 North State Street, Painesville, Ohio.

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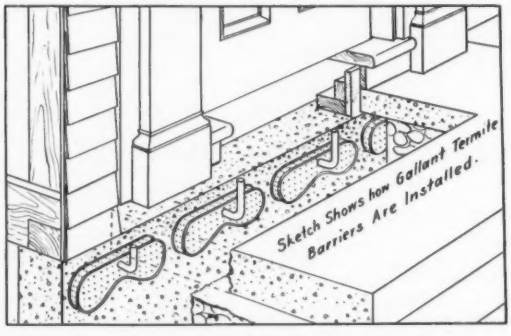

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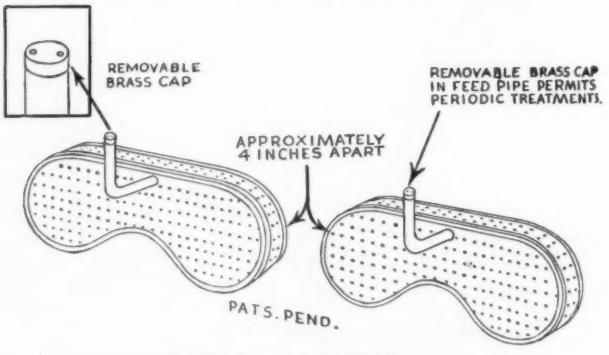
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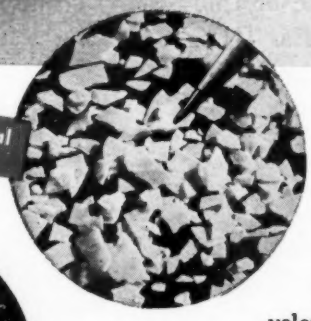

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Opportunities for PCO's

A PCO CHALLENGE *from the* BAKING INDUSTRY

BY THE DIRECTOR, DEPT. OF SANITATION, AMERICAN INSTITUTE OF BAKING, CHICAGO, ILL.
EDWARD L. HOLMES

DURING the past five years, there has been an increasing amount of pressure brought upon all food industries to inaugurate "sanitation programs" within their own industry. This pressure has come primarily from governmental enforcement of the Federal Food and Drug Act of 1938. It is obvious that the Federal Government through the U. S. Food and Drug Administration, which is limited in size both as to personnel and budget, can never control adequately every food plant within this great country. Their method of regulation consists essentially of a program of projects set up to devote intensive attention from time to time upon those industries most requiring it and upon those types of violations which infringe most strenuously upon the consuming public's rights.

The most outstanding of these projects, in writer's opinion, is that involving filth in foods. Work under this project has brought a new concept into food plant sanitation, in that it has provided for regulation of unhygienic conditions resulting in the contamination of food with repugnant or repulsive extraneous matter. This is not necessarily of danger from a public health viewpoint, but it is something which the consuming public considers abhorrent and which will never be acceptable. This type of repugnant filth consists of insect fragments, insect excreta, whole insects of both the larval, pupal, and adult stages, rodent hairs, fragments of rodent hairs and fragments of rodent excreta. Almost universally, enforcement of the Food, Drug and Cosmetic Act in its filth project has concentrated upon such excretory products of animals and fragments of their bodies. The finding of these minute fragments in food products themselves has also been correlated in some degree with specific insanitary conditions in the plant.

Abhorrent conditions found in bakeries have been well catalogued by government officials. When an inspection is made, there are noted:

1. Evidences of infestation
2. The avenues of entry by which means the rodents or insects are able to get into the plant.
3. The avenues of transmission of filth whereby the insects or rodents from the infestation existing within the plant get into the finished products, either in whole or in minutely divided form.

All of these inspection points, at times of inspection by the government, are recorded and the bakery management held personally responsible in detail upon subsequent court action.

New Opportunity for PCOs

It is with this responsibility newly laid upon the baker that the pest control operator now comes into the picture. The first reaction of the baking industry when faced with this was to turn to members of the pest control industry, bringing them in to do what was needed in order to overcome the problems of infestation. However, all too often, the pest control industry has not been able to assume its share of the responsibility. Perhaps this has been due to a lack of understanding of the reason for the bakers more intense interest in rodent and insect control problems.

Up until the passage of the Food, Drug and Cosmetic Act of 1938, pest control operators were employed by bakers primarily to eliminate rodents and insects because of the economic pressure which the unchecked presence of these pests exercised upon the bakery. There were material losses in raw materials or ingredients and sometimes in the stocks of finished products held temporarily in storage. *Methods of control* developed by the pest control industry *centered* chiefly about the *bringing down* of the pest population *to the numerical point where these economic losses ceased. There was no concept of bringing the infestation down to the point of absolute zero.* However, modern-day sanitation, as required by the Food, Drug and Cosmetic Act of 1938, requires that for a bakery the pest population must be maintained as close to the absolute zero as it is humanly possible to do so. Failure to understand this requirement represents the principal basic difference of opinion that now exists between the baking industry and the pest control industry.

The baking industry wants pest control methods used which will definitely eliminate all rodents and all insects from the interior of their plants once and for all time. The pest control industry today, on the part of many individual operators, still believes that pest control in a bakery is comparable

to pest control in non-food establishments where this is not necessary. Consequently, they attempt merely to bring the pest population down to a "reasonable" or normal level.

There must be no misunderstanding on this question. The baking industry is going to continue to rely in large measure upon the pest control operator for rodent control and, perhaps in a lesser but still considerable measure, for insect control. However, the pest control industry must also come to a better realization of the new needs of the baking industry. These new needs require measures to be adopted which will not only effectively eliminate the rodents and insects already present, but which will also establish proper precautionary measures so that new rodents and insects will be efectively prevented from entering and living in the bakery after the initial elimination of those already there.

The method of operation of such a program will be different from the type of pest control in bakeries followed all too often in the past, in that it will not be possible to achieve such coverage by routine visits for the purpose of setting out rodent baits, insect powders, ad making routine operations by non-technical employees.

"Good Housekeeping" of Client's Premises

The pest control operator of the future, if he takes advantage of the opportunities these changes offer, will be able to demand and get high remuneration for his services, but these services will have to be performed by key, technically trained personnel. The type of service that the baking industry has in mind has often been described as "good housekeeping." Such a service will first involve the determination of the rodent proofing measures to be required. Then, a survey must be made to detect the presence and make recommendations for the elimination of rodent harborages. A thorough survey of storage conditions must be made to determine whether or not proper cleaning is performed together with a survey of manufacturing equipment to see if it is kept properly clean so that insect and rodent infestation can not develop within it.

These surveys must be undertaken personally by an expert trained in entomology and rodent control and in problems of engineering and design sufficiently to determine real defects when found. It is a difficult job but the baking industry is so much in need of such services that unless the pest control industry can give these services, others will be sought. Bakers now have such services in mind as the only ones filling their needs and they are going to get them somehow.

A New Sanitation Industry

A NEW INDUSTRY has arisen which is directly in competition with the pest control industry. This is that of the "sanitation counselors." Many of the people engaged in this new industry are former government employees, and they are all working in open competition with the pest control industry for the business of the big food manufacturing industries. These sanitation counselors are organizing good housekeeping services as just described, and bakers are turning to them every day leaving the only role for the pest control operator to be that of carrying out routine operation under the sanitation counselors recommendations.

This term, sanitation counselor, does not describe the advisors employed by entire industries to advise the whole group as to the general aims of modern-day sanitation and the most effective means of achieving them. There is confusion of thought here, for many pest control operators think of such advisors, of which the writer is, of course, one, as being directly in competition with the pest control industry. This is not true, such industry-wide advisors, including the writer, are definitely aware that the pest control industry, if it awakens to the new call for better service, can very effectively aid their industries. However, in the absence of such an awakening, these advisors must necessarily turn the attention of their industries to the sanitation counselor type of service. This comment is particularly applicable to the baking industry.

Past Relations With the Baker

At the present time, most bakers are employing pest control operators for their rodent control program. Usually, no change is contemplated by them until the firm is found by government inspectors to be conducting a rodent or insect infested plant. As soon as this happens, the pest control operator is likely to go out the window unless he is able to meet the challenge effectively. Indeed, the time is shortly coming when bakers may have even learned to profit by the experiences of their fellow bakers, and endeavor to gain effective control before they themselves are caught. It is with this thought in mind that the industry has established in its own scientific foundation, the American Institute of Baking, a Sanitation Department to advise them of the inherent dangers and best means of remedying them.

As for insect control, most bakers also employ pest control operators to eliminate the household type of insect, such as the cockroach and silver-fish, that are all too often found in bakeries through neglect and poor housekeeping in the maintenance departments. However, bakers also realize now that they have insect problems in their machinery and they have found the quality of control of this type of insect infestation by pest control operators in the past as not having been of sufficiently high type to justify their turning over their machinery to the pest control operator for insect control measures. This is because, all too often, the P.C.O. that actually comes into the bakery is a relatively inexperienced workman, trained to do some specific simple job, rather than an expert who can talk intelligently about infestation of baking machinery.

In a recent issue of Pest Magazine, a typical old time pest control operator was described: "A young man rushed into a food plant with a little black bag yelling 'exterminator.' He then spent twenty minutes in a very large establishment, obviously heavily infested with mice, rats, and every type of insect. At the close of this time he stopped at the office to

get a call book signed to show he had made the call." All he had actually done was to leave a trail of insecticidal powders and a few baits in isolated sections of the plant. No actual corrective measures were performed.

The "exterminator" with his little black bag, rushing about dropping poison seeds and powders and hurrying by the office to get his card signed to show that he had been there will never convince a baker that he should trust the P.C.O. with the problems inherent in cutting down insect infestation in his production machinery. For this reason, the baker is undertaking to learn how to do so himself. He wants to learn how and will undoubtedly carry out most of these operations independently of pest control operators unless that industry can, of their own volition, show they can study machine design and do a more efficient job at less cost with subsequent freedom from worry on the part of the baker.

The *baking industry wants freedom from worry* on insect and rodent control in its plants. They have established a program through the American Institute of Baking which is planned to tell them how they can achieve this freedom. It can be done only by proper rodent proofing of the bakery followed by adequate baiting and trapping exterminating methods to eliminate the odd stray that gets into the plant. Insect control can only be achieved by proper use of all methods of control, ranging from residual spray methods in those places where residual sprays can be used safely, contact spraying methods in those places where only such are safe, and an occasional spot or local fumigation job when required. The baker intends that he should be given proof of understanding of all these problems by the operator. He wants to be told the exact remedial measures that are to be adopted. Then, after having learned the remedies, he wants to utilize the most effective and least expensive method of control. Such a service as the "good housekeeping" service is the only means by which the pest control industry can hope effectively to retain permanently the good will and custom of the thinking portion of the baking industry.

For Better Relations

The writer has many friends in the pest control industry, and sometimes he is amazed at the lack of appreciation which they exhibit of this new attitude on the part of the baking industry. They are still prone to argue about the points of expediency, as to whether or not they should divulge "secret" methods of control to the baker. Of course, they must tell the baker when and where they use deadly poisons in his plant. It is a food plant, and as such, he, the baker, is held personally responsible by government authorities for the placing of poisons anywhere in the plant.

Again, when the baker is cited to show cause why he should not be prosecuted by the government for violation of the Food, Drug, and Cosmetic Act, it is he who faces prosecution, not the pest control operator. It is not a question of who is going to be convicted personally in the Federal courts. That person is the baker and he does not intend to be and will not be held responsible for unknown acts of the pest control operator. This may mean that he must drop the services of even an old friend, who insists on distributing unknown poisons in unknown places about the plant.

The baker in the future will also want to know his pest control operator personally in that he will want rather frequent visits by a key man who will go over the plant and discuss his problems in detail, bringing to his attention any dangerous situation that may have been noted by him.

In other words, it appears that the pest control industry, to step effectively into the role of providing a *good housekeeping service* for bakers, must become an industrial sanitation and counsel service, rather than just an exterminator. It is a big order but one that will be well repaid, not only in financial reward, but in the more subtle sense, that any industry gains by an increase in scientific stature.

"Welcome" However You Spell It

Harry Essick of the Public Health Service, engaged in rat control activities for many years and well known to many PCOs, was recently loaned by the USPHS to the Health and Sanitation Section of the Institute of Inter-American Affairs. That organization has sent him to Mexico to assist that country in instituting modern, effective rat control procedures.

Among other things, Essick has been teaching the use of 1080 and a considerable amount of poisoning has been done, especially in

such places as public markets. Only the best procedures are being taught, including placing souffle cups out one night and picking them, as well as the dead rats, up the next morning.

The Mexican people with whom he came in contact became quite fond of Essick and one morning one of them came in and asked him to please print the words, "Welcome Mr. Harry Essick" on a sheet of paper. Slightly mystified, he did so and the man left. A short time later the same individual politely summoned him to the roof of the two-story building occupied by the Mexico City Rat Control School. On the roof was assembled a group of Harry's students and assistants. They asked him to look over the edge of the building to the sidewalk below. There, using the bodies of some of the rats which had just been recovered at a public market, Harry's students had spelled out the words he had written for his Mexican assistant.

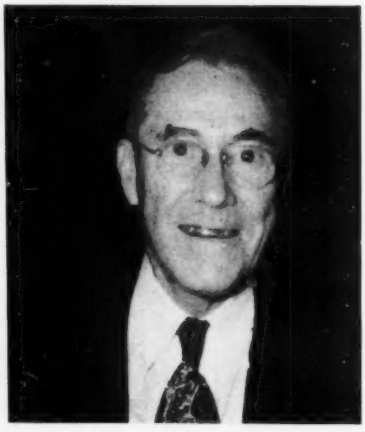
This unusual means of welcoming Harry is reproduced above. What better way could they express their appreciation!

1948 Registration for 12th Annual Purdue PCO Conference Beats '47 by 30

OVER 225 persons attended the 12th Annual Pest Control Operators Conference held at Purdue University, West Lafayette, Indiana, April 5-9. This exceeded the 1947 registration of 195 by at least 30. Twenty-three states and Canada were represented with pest controllers coming from as far West as Colorado and as far South as Texas and Florida. Five of the registrants had attended all 12 of the meetings held at Purdue. Seventy-four attended this meeting for the first time. The National Pest Control Association was well represented officially with 9 of its 11 living presidents attending.

Professor J. J. Davis and his staff from Purdue's Entomology Department provided an outstanding and well-rounded program for beginner- and experienced-PCOs alike. Leaders from neighboring institutions, entomological research projects and industry spoke during the five-day short course. Meetings, laboratory work and displays of insects and equipment were centered in the Agricultural Hall with demonstrations of application equipment, including the TIFA fog applicator, being held in the Judging Pavilion. Motion pictures on rodent control and DDT were shown in the Memorial Union Building where many had room accommodations.

A 90-page manual, which outlined subjects discussed in advance, included in the $12.50 registration fee, was was supplied each person and could be used for taking notes during the lectures. Many lectures were illustrated with slides and Extension Entomologist, Glen E. Lehker of Purdue deftly cartooned his talks with chalk and easel to simplify understanding of the rudiments of insect structure and classification.

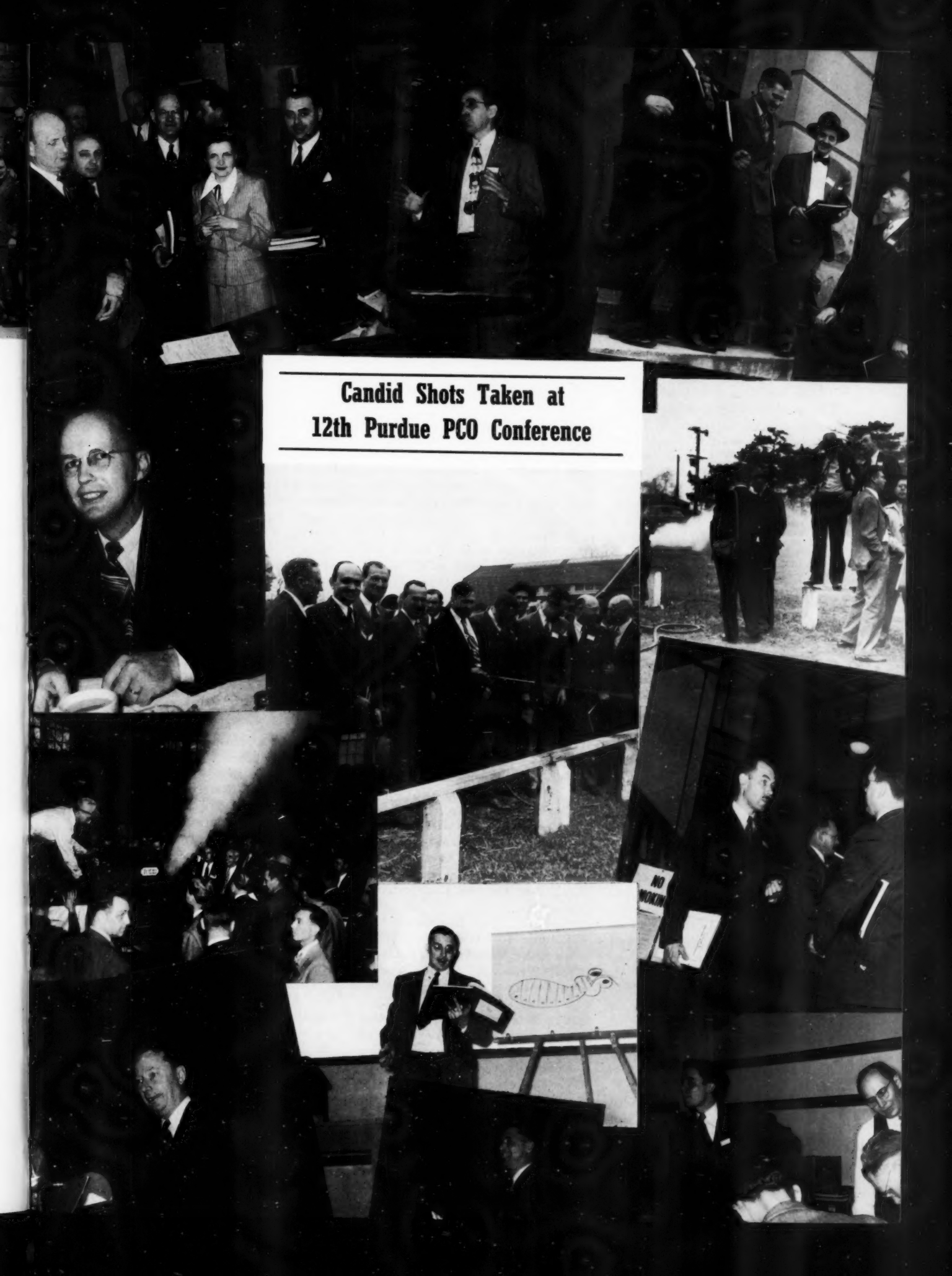


Professor J. J. Davis

Dr. T. E. Snyder, outstanding termite authority, Senior Entomologist. Bureau of Entomology and Plant Quarantine, USDA, presented the latest information on the biology of subterranean termites at Wednesday's meeting. Dr. W. N. Bruce, Illinois State Natural History Survey, Urbana, Illinois, gave recent findings in the control of insects attacking livestock and Dr. Ira Hatfield, Planetary Chemical Co., Creve Coeur, Mo. reviewed his continuing research on powder-post beetles (published in complete form elsewhere in this issue) and other insects attacking wood.

Purdue's Vice-President, F. C. Hockema was Toastmaster at the Annual Dinner held Thursday evening in the Memorial Union Building. By way of introduction for most of the other speakers on the program, Dean Hockema had written appropriate poetry, "free style," in the lighter vein. Speakers on this program included Associate Dean, Purdue School of Agriculture, V. C. Freeman, Professor J. J. Davis and NPCA Executive Secretary, William O. Buettner. Buettner announced that the National Pest Control Association had contributed another $400 to the Research Fund at Purdue and was adding $100 to the Adult Education Building fund bringing these two funds to a total of $1745.53 and $400 respectively. Professor Davis announced that the annual $200 scholarship awarded to the Purdue freshman majoring in Entomology attaining the highest scholastic record was being split between George Gilmore and Bill Graham, sons of men in the pest control field. Total amount contributed to the student loan fund has reached $2000.

It was announced that the four-year curriculum for professional pest control operators, activated in September 1946 with an enroll-



Candid Shots Taken at 12th Purdue PCO Conference

ment of 12 students, has grown to require the services of a full-time professor. Assistant Professor John V. Osmun was introduced as the man who has been appointed to the Department of Entomology staff to fill that post.

Keynote address at Thursday's dinner meeting was delivered by Dr. H. B. Hass, head of the Department of Chemistry, Purdue, entitled, "What's New in Chemistry." This scholarly presentation reviewed much of the current chemical research as it will effect man's daily life in the years ahead.

In his closing remarks at the Thursday banquet, Dean Hockema proposed the following nomination be adopted by the group present: "For the distinguished services performed by Bill Buettner and J. J. Davis in the field of insect extermination, thereby adding to the comfort of mankind, I wish to nominate these two gentlemen as 'The Bug Men of This Generation'." The nomination was affirmed by unanimous applaus.

Beautiful spring weather held throughout the entire program which was arranged as follows:

Registration was held on Sunday, April 4 and on Monday.

Monday morning was arranged to give newcomers the principles of entomology and insect control with Purdue Professors G. E. Lehker, B. E. Montgomery and J. J. Davis as principal speakers. In the afternoon, Professor H. O. Deay was in charge of the insect classification laboratory which had to be held in two sessions because of the large attendance.

Tuesday morning's meeting was devoted to Flies, "The Bug of the Year," with J. Harvey Sturgeon, Sturgeon Pest Control Co., Louisville, Ky., presiding. The kinds of flies, how to recognize them and a discussion of their biology was reviewed by H. O. Deay and J. J. Davis. B. E. Montgomery talked on the Economical Importance of Flies followed by a report of Methods of Prevention and Control, with Special Reference to Barn and Cattle Spraying by Dr. W. N. Bruce. Professor John V. Osmun presented Adult Mosquito Control in Camps, Resorts, Recreation Centers, etc.

NPCA President, George Hockenyos presided over Tuesday afternoon's discussion of Sanitation and Consultation: A New Field for the PCO. Talks on Consultation Service in Food Processing Plants by Bartlet W. Eldredge, Waltham (Mass.) Chemical Co.; on State Health Department Inspection Service by B. A. Poole, Director, Bureau of Environmental Sanitation, Indiana State Board of Health, Indianapolis; on Dish Washing and Procedure in Taking Swab Counts by J. J. Wilson, Kalusoff, Ltd., Springfield, Ill.; and on the Routine of Laboratory Technique in Determining the Results of Swab Tests by Fred L. Willis, Student Health Service, Purdue, made up the program.

Motion pictures on Antu, Modern Pied Piper, Four Little Mice, Report on DDT and an open forum were topics for the Tuesday evening session. Milton Caroline was Chairman.

Wednesday morning was devoted to Termites with B. C. Scherzinger, Extermital Termite Control, Cincinnati, O., presiding. Dr. T. E. Snyder, Senior Entomologist, Bureau of Entomology and Plant Quarantine, USDA, Washington, D. C., addressed the meeting on Bringing Us Up-to-date on the Biology of The Subterranean Termite. Other phases of termite control were covered as follows: What Do We Mean by the Principles of Termite Control by William O. Buettner, NPCA Secretary; Problems in Termite Control by Arthur Ochs, Antimite Proofing Co., St. Louis; and What Shall We Do About Guarantees by H. L. Gellton, Orkin Exterminating Co., Atlanta, and Lee C. Truman, Arab Pest Control Co., Indianapolis.

Application of Insecticides was the topic for Wednesday afternoon with demonstrations made by Arden Price, W. B. McCloud & Co., Chicago; Dave Lewis, Hudson Manufacturing Co., Chicago; Jack Benmosche, Pest Control Equipment Co., New York; Virgil R. Knapp, Entomological Service and Supply Co., Zionsville, Ind.; Glen E. Lehker, Extension Entomologist, Purdue: and W. S. Gilpin, Fog, Inc., Chicago. George C. Decker, Chief in Entomology, Illinois State Natural History Survey and Illinois Agricultural Experiment Station, Urbana, presided over this meeting.

C. O. Partlow, Reliable Exterminating Co., Lafayette, Ind., chairmaned the evening meeting on Wood-Infesting Insects with Ira Hatfield, Planetary Chemical Co., Creve Coeur, Mo., talking on Recognition of Insects Attacking Wood and Their Damage with emphasis on the powder post beetle and Glen E. Lehker discussing powder post beetles on the basis of his experience.

Thursday morning was devoted to Rats and Mice with C. Norman Dold, Rose Exterminating Co., Chicago, presiding. The Life History and Biology of the Brown Rat was reviewed by Milton Caroline, Asst. District Agent, U. S. Fish and Wildlife Service, Purdue. G. C. Oderkirk, District Agent, U. S. Fish and Wildlife Service, Purdue reported on the National Urban Rat Control Program. Caroline then lead a six-man panel discussion on rodent poisons and bait formulas. Members of this group, Lee Truman, Bill Graham, Joe Wineburgh, Albert Buckle, R. E. Zimmerman and Harlam Shuyler highlighted effective measures for rodent control. Proper bait selection depends upon the use of a variety of baits, Truman advised. Graham said the choice of poison depended upon the competency of the person using it, and it was Wineburgh's opinion that PCOs could prepare their own bait mix most economically. Bait placing is one of the most important phases of pest control according to Zimmerman who urged particular caution because of the new toxic chemicals being used today. Following the round-table discussion, Harlem B. Ives, Rose Exterminating Co., Detroit, covered the topic of House Mice and Their Control.

The important subject of Chemicals and Their Toxicity brought together the following men discussing the newer developments: Harold Jennings, Smithereen Co., Chicago, on DDT and Related Organic Chemicals, Their Relations to the PCOs; John A. Zapp, Jr. Asst. Director, Haskell Laboratory, Wilmington, Del. on Methoxychlor; C. J. Krister, DuPont

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Experiment Station, Wilmington on Methoxychlor; R. E. Hamman, Julius Hyman & Co., Denver on Chlordane; William Dickison, U.S. Industrial Chemicals, Inc., Chicago on Piperonyls; Professor John V. Osmun, Purdue on Benzene Hexachloride and Parathion; and George L. Hockenyos, Sentinel Insect Control Laboratories, Springfield, Ill., on Other Chemicals. W. O. Buettner presided over this meeting.

The Annual Dinner was held Thursday evening, April 8th.

Friday morning's meeting included talks on Problems of the Food Industries and How the PCO Can Help by Charles A. Clark, General Foods Corp., New York City; Use of Rock Wool in Restaurant Exhausts to Remove Grease by R. O. Williams, Williams Co., Evansville, Ind.; Starling Control by J. Harvey Sturgeon, past NPCA prexy; and How We can Cooperate With and Secure Recognition from Health Departments by Harlem B. Ives, Rose Exterminating Co., Detroit.

Time was set aside at the end of each meeting to allow for questions and further discussion.

Registration List

Those attending all twelve years:
William O. Buettner
Norman C. Dold
Harlem B. Ives
W. W. Scott
Jules Smith

Living NCCA president attending:
George L. Hockenyos
J. Harvey Sturgeon
Theodore Oser
George R. Elliott
H. K. Steckel
Bartlett W. Eldredge
C. Norman Dold
Thomas C. Raley
William O. Buettner

Anderson, Earl A., Anderson Exterminating Co., Chicago 12, Ill.
Augsparger, Waldo R., Huemite and Co., Dayton, O.

Baase, Charles H., Extermital Termite Service, New Castle, Ind.
Baker, Marshall, Charles Danny and Co., St. Louis 17, Mo.
Ballantyne, Michael, Ballantyne Exterminating Co., Chicago 14, Ill.
Barnett, Richard K., Barnett's Pest Control, Dayton, O.
Barnett, Mrs. Richard K., Barnett's Pest Control, Dayton, O.
Barnett, William K., Barnett's Pest Control, Terre Haute, Ind.
Barrett, Roy L. Antimite Termite Control Co., Waverly, W. Va.
Baxter, Don L. Baxter Exterminating Co., Anderson, Ind.
Baxter, L. C., Baxter Exterminating Co., Anderson, Ind.
Bell, Kenneth C., Brown Bell Pest Control, Amarillo, Texas
Benmosche, Jack, Pest Control Equipment Co., New York City
Berger, Bernard G., Arwell, Inc., Waukegan, Ill.
Berglund, Len H., W. B. McCloud and Co., Chicago, Ill.
Bernard, S. N., Arwell, Inc., Aurora, Ill.
Biddle, Allen, Biddle Exterminators, Blytheville, Ark.
Billington, Gale, Charles Denny and Co., St. Louis 17, Mo.
Boaz, Clarence W. Jr., Clarence W. Boaz Co., Inc., Anderson, Ind.
Boaz, Clarence W., Sr., Clarence W. Boaz Co., Inc., Anderson, Ind.
Bosley, A. D., A. D. Bosley Co., Indianapolis, Ind.
Bowser, R. R., Bowser-Morner Test Laboratories, Dayton, O.
Breed, E. N., Peoria Pest Control, Peoria, Ill.
Bridges, Johnny, Arnold Exterminators, Hamilton, O.
Bridges, Verdie, Arnold Exterminators, Cincinnati, O.
Brooks, William P., Arab Pest Control Co., Springfield, O.
Brookstra, C. L., Brookfield Pest Control, Davenport, Iowa.
Bruce, Willis, Ill. State Natural History Survey, Urbana, Ill.
Buck, Albert A., American Exterminating Co., Inc., Philadelphia, Pa.
Buettner, William O., Buettner Pest Control Co., Brooklyn, N. Y.
Burden, Everett A., Cherokee Co., Marion, Indiana
Burgel, Hugo, Capital City Exterminating Co., Columbus, O.
Burr, A. W., Superior Exterminating Systems, Rockford, Ill.
Byrne, J. R., Apex Exterminating Co., Washington, D. C.
Bushouse, Albert G., A—P Exterminating Service, Kalamazoo, Mich.

Campnell, Harold, Arab Pest Control, Lima, O.
Carncross, I. B., Syracuse Chemical Co., Syracuse, N. Y.
Cauble, Dan W., Jr., Orkin Exterminating Co., Inc., Knoxville, Tenn.
Claeys, Frank J., Valley Exterminating Systems, St. Charles, Ill.
Clark, Charles A., General Foods Corp., New York City
Clark, Russell G., Chicago Exterminating Co., Chicago, Ill.
Cochnower, H. J., Cochnower Pest Control Service, Lafayette, Ind.
Coffing, Jess W., Kellogg Co., Battle Creek, Mich.
Cohoon, Earl, Barnett's Pest Control, Terre Haute, Ind.
Combs, Ward A., Presto — X Co., Omaha, Neb.
Crosby, Bernard D., Commonwealth Sanitation Co., Pittsburgh 13, Pa.
Crosby, Stanford, Commonwealth Sanitation Co., Pittsburgh 13, Pa.
Cummings, Paul, Arwell, Inc., Danville, Ill.
Cushing, Charles D., Vogel — Ritt, Inc., Philadelphia, Pa.
Custer, Clarence C., Antimite Termite Control, Waverly, W. Va.

Danells, A. J., Acme Exterminators, Kansas City, Mo.
Davis, Arthur L., A-B-C Exterminating Co., Dayton, O.
Davis, Harold L., Union Extermital, Manilla, Ind.
Decker, George C., Ill. St. Nat. Hist. Survey, Champaign, Ill.
DiFiore, Joseph, Globe Exterminating Service, Chicago, Ill.
Delaplane, W. K., Jr., Illini Pest Control and Service, Inc., Urbana, Ill.
Diehl, Plummer E., Plummer E. Diehl Co., Salem, O.
Dold, C. Norman, Rose Exterminator Co., Chicago, Ill.
Douglas, Amos, Barnett's Pest Control, Dayton, O.
Doute, Leo F., Potter Pest Control Service, Wyandotte, Mich.
DuChanois, F. Robert, Entomological Ser. and Supply Co., Zionsville, Ind.

Edmondson, Calvin L., Acme Pest Control, Cincinnati, O.
Eichstedt, Carl E., Extermite Chemical, South Bend, Ind.
Eldredge, Bartlett W., Waltham Chemical Co., Waltham, Mass.
Elliott, George R., Ransford Insecticide Co., Worchester, Mass.
Emerson, K. C., K. C. Emerson, Angola, Ind.
Engle, Carson, Acme Pest Control, Cincinnati, O.

Fellton, Herman L., Orkin Exterminating Co., Atlanta, Ga.
Ferguson, Chas. W., Sentinel Pest Control Co., Decatur, Ill.
Fowler, J. Art, Louisville Chem. and Exterm. Co., Louisville, Ky.
Franklin, Joseph R. Hammond Pest Control, Inc., Hammond, Ind.

Gehrling, Otto, Smithereen Co., Chicago, Ill.
Gibson, Walter S., Extermital Termite Service, Lafayette, Ind.
Gilpin, W. S., Fog, Incorporated, Chicago, Ill.
Griffin, Linden L., Griffin Manufacturing Co., Galesburg, Mich.
Gross, Joseph, Control Serv. and Exterm. Co., Cleveland, O.

Haggerty, Ira, Arwell, Inc., Peoria, Ill.
Hahne, J. W., Smith Exterminating Co., Omaha, Neb.
Hamman, Robert E., Julius Hyman and Co., Denver, Colo.
Hannum, William B., Protex Service, Inc., Chicago, Ill.
Hatfield, Ira, Planetary Chemical Co., Creve Coeur, Mo.
Hedlund, D. Norwood, Hydro Fumigating Service, Jamestown, N. Y.
Hedlund, Milton A., Hydro Fumigating Service, Jamestown, N. Y.
Hemmert, George, Safe Way Exterminating Co., Detroit Mich.
Herod, R. E., Pest Control Technicians Ltd., Hamilton, Ont., Canada
Hill, Leonard R., Laing Exterminating Co., Cleveland, O.
Hobbs, Fred, Arab Pest Control, Kokomo, Ind.
Hockenyos, G. L., Sentinel Laboratory, Springfield, Ill.
Hodgel, Jack, Breth-O-Death Labs, Inc., Grand Rapids, Mich.
Hollatz, Edwin A., Rose Exterminators, Detroit, Mich.
Hoover, Mrs. R. B., Arnold Exterminators, Cincinnati, O.
Humphreys, Don, Arab Pest Control, Lima, O.
Hunter, George T., Hunter's Pest Control, Fort Wayne, Ind.
Hutchison, Everett B., Hutchison Pest Control, Pueblo, Colo.

Isherwood, H. R., The Antimite Co., St. Louis, Mo.
Ives, Harlem B., Rose Exterminating Co., Detroit, Mich.
Izor, J. W., Huemite and Co., Dayton, O.

Jennings, H. E., Smithereen Co., Chicago, Ill.
Jett, Robert, Barnett's Pest Control, Dayton, O.
Johnson, M. H. Extermite Chemicals, In. , Benton Harbor, Mich.
Jowett, Wm. T., L. A. Moore and Co., Utica, N. Y.

Kennard, L. R., A. B. C. Exterminating Co., Dayton, O.
Klein, Ellsworth G., Klein Pest Control Co., Milwaukee, Wis.
Kline, Murray, Commonwealth Sanitation Co., Pittsburgh, Pa.
Knapp, Virgil R., Entomological Service and Supply Co., Zionsville, Ind.
Knote, C. E., Jr., Hudson Mfg. Co., Chicago, Ill.
Knudson, E. B., Arwell, Inc., Waukegan, Ill.
Krister, C. J., Du Pont Co., Wilmington, Del.
Kuntz, Elmer, Lien Chemical Co., Chicago, Ill.
Kurtis, Stephen, Kurtis Exterminating Co., Ann Arbor, Mich.
Kyle, C. V., Extermital Chemical, Inc., Dayton, O.

Lale, Gertrude, Rid-Um Exterminating Co., Flint, Mich.
Large, L. H., Valparaiso Pest Control, Valparaiso, Ind.
Lear, Frances, Economy Exterminators, Miami Beach, Fla.
Lear, Thornwell R., Economy Exterminators, Miami Beach, Fla.
Levy, Morton J., Twin City Exterminating Co., St. Paul, Minn.
Lewis, Bert, Lewis Pest Control, Muncie, Ind.
Lewis, David P., Hudson Mfg., Co., Chicago, Ill.
Lind, Stanley L., American Laboratories, Chicago, Ill.
Locke, Walter, General Mills, Inc., Minneapolis, Minn.
Lustfield, Wm. W., Brookfield Pest Control, Davenport, Iowa
Lynn, Ellison, Lynn Exterminating Co., Rochester, Minn.

Mahon, Thomas H., N. P. C. A., Brooklyn, N. Y.
Martin, Craig C., T. N. T. Exterminating Co., Akron, O.
Martz, C. E., Extermital Chemicals, Inc., Xenia, O.
McCain, W. H., Extermital Chemicals, Inc., Dayton, O.
McConnell, Geo., Arab Pest Control, Lima, O.
McCullough, D. L., Sanitary Exterminating Co., Williamsport, Pa.
McDaniel J. J. International Exterminating Co., Chicago, Ill.
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McLeod, Shirley F., City Exterminating Co., Buffalo, N. Y.

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Meyer, Martin T., Theodore Meyer Est., Philadelphia, Pa.
Miller, Abe S., Levenson Chem. and Ext. Co., Omaha, Neb.
Moore, Leon A., L. A. Moore and Co., Utica, N. Y.
Mootz, Daniel E., Arab Pest Control, Springfield, O.
Murphy, John R. Arab Pest Control, Indianapolis, Ind.
Murrison, Robert E., Brookfield Pest Control, Davenport, Iowa

Neal, Harvey, Extermital Termite Service, Lafayette, Ind.
Nelson, James A., Pests and Their Control, Cleveland, O.
Norman, Lewis, Smithereen Co., Chicago, Ill.

Ochs, Arthur, Antimite Termite Proofing Co., St. Louis, Mo.
O'Donnell, Ed. I., O'Donnell I and R Service, Quincy, Ill.
O'Hara, C. T., Monroe Laboratories, Chicago, Ill.
Olson, H. E., Chapman Chemical Co., Chicago, Ill.
Oser, Julian, Oser Exterminating Co., Denver, Colo.
Oser, Maurice, Oser Exterminating Co., Denver, Colo.
Oser, Ted, Orkin Exterminating Co., Atlanta, Ga.
Otto, W. E., Brookfield Pest Control Co., Davenport, Iowa

Partlow, C. O., Reliable Exterminators, Lafayette, Ind.
Pe'en, Fred O., Extermite Chemicals, Inc., Benton Harbor, Mich.
Peterson, John E. Dow Chemical Co., Midland, Mich.
Phippard, Wm., Wilmar Co., Cincinnati, O.
Portwood, H. J., T. N. T. Exterminating Co., Akron, O.
Potter, O. L., O. L. Potter Pest Control Svc., Ecorse, Mich.
Price, A. W., W. B. McCloud and Co., Chicago, Ill.
Pryor, John F., Corn Products Ref. Co., N. Kansas City, Mo.
Purdy, J. L., Extermital Termite Service, Hamilton, O.

Raley, Thomas C., Getz Exterminators, St. Louis, Mo.
Reeves, J. H., Industrial Fumigant Co., Chicago, Ill.
Refbord, T. P., American Cyanamid Co., New New York, N. Y.
Reisman, Meyer M., Stone Chemical Laboratories, Chicago, Ill.
Richards, Arthur H., A. H. Richards and Sons, Wilkes Barre, Pa.
Ritt, A. E., Vogel-Ritt, Inc., Philadelphia, Pa.
Robar, J. A., Robar Pest Control Co., Sioux City, Iowa
Robertson, W. R., Louisville Chem. and Ext. Co., Lexington, Ky.
Roll, Wm. E., American Disinfectant Co., Washington, D. C.
Rueter, Fred A., Homestead Valve Mfg., Co., Coraopolis, Pa.

Sackriter, Fred J., Stone Chemical Lab., Chicago, Ill.
Sain, Lea A., A. B. C. Exterminator, St. Louis, Mo.
Schendel, Robert R., Schendel Pest Control, Topeka, Kansas
Scherzinger, B. C., Extermital Termite Control, Cincinnati, O.
Scott, W. W., Arwell, Inc., Waukegan, Ill.
Sellman, L. S., Vogel-Ritt, Inc., Hagerstown, Md.
Sempliner, Myron, Eradico Products Co., Detroit, Mich.
Sheldon, A. C., Arab Pest Control, Terre Haute, Ind.
Schuyler, Reynold, Termite Exterminating Co., Kansas City, Kan.
Smith, Jules B., A-Veri-Best Exterminators, Chicago, Ill.
Smith, Julius S., Eradico Products Co., Detroit, Mich.
Smitter, Harold, Smitter Pest Control Service, Grand Rapids, Mich.
Snyder, Thomas E., Bur. Ent. and Pl. Quar., Washington, D. C.
Spellios, George, General Exterminating Co., Indianapolis, Ind.
Spyre, John K., J. K. Spyre Exterminating Co., Detroit, Mich.
Steckel, H. K., Tornado Mfg. Co., Columbus, O.
Stewart, F. D., Monsanto Chemical Co., St. Louis, Mo.
Sturgeon, J. Harvey, Sturgeon Pest Control, Louisville, Ky.

Terrell, Ray R., Arab Pest Control, Springfield, O.
Thomas, Jack, Jack Thomas Termite Control, Charlestown, Ill.
Thompson, Jack E., General Ext. Co., Erie, Pa.
Trout, Walter A., Industrial Pest Control, Omaha, Neb.
Truman, Lee C., Arab Pest Control, Indianapolis, Ind.
Turrie, W. J., Wil-Kil, Inc., Milwaukee, Wis.
Usher, M. H., City Sanitary Ext., Co., Lincoln, Neb.

Van Schaick, A., L. A. Moore, and Co., Utica, N. Y.

Walls, Vern V., Modern Pest Control Service, Cedar Rapids, Iowa
Warnock, C. C., Extermital Termite Service, Plymouth, Ind.
Warthen, W. R., Vogel-Ritt of Ohio, Cincinnati, O.
Watkins, J. A., Vogel-Ritt, Inc., Detroit, Mich.
Weems, W. E., American Cyanamid Co., Louisville, Ky.
Weintraub, Mark, Astor Exterminating Co., Boston, Mass.
Wickes, L. L., Natural Exterminating Co., Kansas City, Mo.
Williams, Larry, Williams and Co., Chicago, Ill.
Williams, O. K., Arab Pest Control, Danville, Ill.
Williams, Paul H., John Powell and Co., Chicago, Ill.
Williams, R. O., R. O. Williams Co., Evansville, Ind.
Wilson, J. J., Kalusoff, Inc., Springfield, Ill.
Windmeier, W. W., Airway Exterminating Co., Chicago, Ill.
Wineburg, J. L., Theodore Meyer Est., Washington, D. C.

Zapp, John A., Jr., Du Pont and Co., Wilmington, Del.
Zimmerman, R. E., Hygienic Sanitation Co., Philadelphia, Pa.
Zolman, Chas. D., Extermital Co., South Bend, Ind.

Curious Rat Joins PCOs At Purdue

VICTORY! Joe Wineburg proudly shows rat he and four other quick-footed PCOs conquered during Purdue Conference.

It looked like a wise thing to do. It might have been a chance to learn something. Perhaps that's the reason a lone Norway Brown Rat scampered across the campus during the 12th Annual PCO Conference at Purdue University, April 5-9.

Maybe he wanted to hear what was being said about his race so he could go back and tell his kinfolk what plans the enemy was making. But his timing was bad. Unwisely he decided to strut his stuff over the lawn in front of the Agriculture Building just as the alert PCOs were assembling for another class in pest control. Quickly he was spotted and five rodent hounds set out on a merry chase to prove their prowess in out-smarting him. After all, they had no other choice.

Surrounded! There was no place for the scholarly rodent to turn. Then victory! He spotted a bush and dashed to seek refuge in its thicket. But, no. Bravely, the PCOs stationed themselves around the shrub. One picked up a rock. Life for the rat was a matter of seconds. Better he should have stayed in the garbage can. The rock was hurled. The aim was perfect and brother rat was dead.

It just goes to show you, pest controllers will conquer the rat menace one way or another even if they must resort to killing them one by one with rocks.

1,000 Honor Pomerantz

The night of April 7th was one Charles Pomerantz will not soon forget. It was then that over 1,000 people gathered at Gothic Lodge No. 934, F. & A. M., West 23rd St. Masonic Temple, New York City, to help observe its "Charles Pomerantz Honor Night." Letters from President Truman, New York's Governor Dewey, Ex-Governor Lehman, New York Mayor O'Dwyer, Dr. Harry Mustard, New York city Commissioner of Health and a telegram from the more than 200 persons attending the Purdue Conference also paid tribute to the man responsible for co-discovering the disease rickettsialpox. Dr. Robert J. Huebner, rickettsial disease expert of the USPS and Dr. F. C. Bishopp, from the Bureau of Entomology and Plant Quarantine spoke on the program. New England and New Jersey P CAs were represented by Kenneth Cook and John Medoff, respectively. Murray B. Trayman, Master, was host.

Field Tests, Lectures Enliven Third Wisconsin Short Course

A varied program with both practical demonstrations and lectures by university professors practical demonstrations and lectures by university professors made up the third annual Wisconsin State Pest Control Operators Convention held in Madison at the Lorraine Hotel, April 1-3. Eighty persons registered for this three-day course planned in cooperation with the department of economic entomology of Wisconsin University.

Dr. John T. Emlen, mammalogist in the zoology department at Wisconsin U., presented a practical demonstration of sanitation, survey, bait mixing, bait placement, rat proofing and foot pump fumigation for rat control during the opening session on Thursday afternoon. A dinner and meeting for Wisconsin PCOs was held in the Pompeian Room. L. B. Kelly acted as chairman for the day's activities.

On Friday E. L. Chambers of the state board of health spoke on insecticide and rodenticide labeling and on federal and state regulations. E. H. Fisher, extension specialist, and Dr. R. J. Dicke, research entomologist, followed with a discussion of effective spraying for mosquitoes, dairy flies, and pea silage. R. D. Shenefelt concluded the morning meeting with a talk on plastic mounts.

At the luncheon meeting in the hotel's Crystal Ballroom, Herbert Anderson, Milwaukee health officer chose for his subject, "Sanitation in Relation to the Pest Control Industry." Harvey Klein supervised Friday morning's program.

During the afternoon, for which Henry Turrie was chairman, Dr. G. S. Kido, research fellow in Wisconsin's entomology department. spoke of insecticide evaluation methods. Dr. T. C. Allen, chairman of the department told of uses for new insecticides. General insect control questions were answered at the close of this session.

H. E. Jennings acted as toastmaster for the banquet held in the main dining room Friday evening. George L. Hockenyos, NPCA President, gave the principal address, entitled "The Future of Pest Control." The Wisconsin association presented enthusiast bow and arrow deer hunter, Professor E. H. Fisher with a complete archery set in appreciation of his efforts in behalf of this successful meeting. A contribution of $100 was also made toward the PCO research fund at the University.

Conferees moved to the university live stock pavilion Saturday morning to hear K. P. Buchholtz discuss weed control. Professor O. I. Berge, extension specialist in the agricultural engineering department, told of the latest spraying equipment with practical demonstrations being given by manufacturers' representatives.

A registration fee of $10.00 for the three-day short course included Friday's luncheon and evening banquet.

Pest control operators assisting with the plans for this meeting were L. B. Kelly, Madison; Vinola Seaver, Beloit; H. E. Johnson, Racine; and the following from Milwaukee: Harvey Klein, Henry Turrie and J. H. O'Leary.

Top: L. B. Kelly using Cyanogas Pump Duster in rat control demonstration.

Bottom: Prof. E. H. Fisher, NPCA Pres. Hockenyos, Harold Jennings and Mrs. L. B. Kelly at WPCA banquet.

Part of group attending Wisconsin PCO Convention held in Madison, April 1-3

New Jersey Pest Control Assn. Inaugurates Short Course in Chemistry . . .

WHEN Dr. J. B. Schmidtt opened the 5th Annual Short Course at Rutgers University, sponsored by the New Jersey Pest Control Assocition, January 19-22, there was a class of about thirty men from several states who had come to learn "The fundamentals of chemistry as it applies to the PCO." Dr. Schmidtt is responsible for several innovations in short courses for PCOs and was again pioneering. Starting from scratch he unfolded certain basic fundamentals and principles of chemistry.

Text book used for this short course was "New Practical Chemistry" by Black and Conant. An outline was used containing references to the text book, for following the lectures and in working problems assigned to the class. The course was arranged as follows:

Part one: The States and Properties of Materials. In this section students received detailed explanations and examples of physical and chemical changes; molecular theory of matter; the physical properties of solids; measures of length, volume and weight; melting points; physical properties of liquids; physical properties of gases; conversion of solids to gas sublimation; combinations of solids and liquids; combinations of liquids in liquids and the combination of liquids in solids and gases.

Part two: Chemical Reactions. This section dealt with Dalton's theory of atoms and molecules; symbols, formulas and valence; chemical equations and computations;atomic structure and valence; molecular and atomic weights; classes of compounds; kinds of inorganic compounds; solutions; types of chemical reactions; non-chemical combinations and organic compounds including isomers.

Three days were consumed in studying parts one and two and the instructors were Professor Robert Fillmer, Doctor Lyle Hageman, Doctor Elton Hansens and Doctor John B. Schmitt.

In addition to the lectures students had exercises in measuring weights and volumes, both in the metric and avoirdupois system, calculating the specific gravity of various materials as well as the specific gravity of mixtures and solutions made up by the class. The class also calculated the recorded changes of temperatures in various solutions both in the Fahrenheit and Centigrade scales.

Microscopic difference between a true solution and a suspension were observed by the class. Other exercises included the calculation of the concentration of a solution by the use of a specific gravity table, and dissolving DDT in various solvents at various temperatures. Those students who had difficulties in calculating percentage solutions were given examples to help them.

Students conducted experiments to prove mixtures can be separated by physical means while compounds can be separated into their components only by chemical means. The words "acid" and "basic" in solutions grew to mean something to the students when they completed the exercises on this subject. Strips of litmus paper were used by the dozen in checking the various solutions. Those experiments which were too dangerous for the "chemists" to handle were demonstrated by Dr. Hageman and Dr. Schmitt and the class was divided into sections so that each student could observe the experiments at close range and had the opportunity to discuss his observations with the instructors.

After three days of basic training the students were ready for Doctor J. M. Ginsburg's emulsions and mixtures as used in the pest control field. Students were provided with oils, concentrated insecticides and emulsifiers. They then made stable oil emulsions, emulsible oils and solvents, emulsible insecticides and prepared stock solutions. Emulsifiers were labeled according to the manufacturer's trade mark as well as their actual chemical composition. At the end of this day the students knew whether they were better off buying ready mixed material or compounding their own concentrates. They also knew the difference between stable and unstable emulsions and were able to form an opinion as to which materials suited their particular needs best.

This year the Educational Committee consisted of John K. Medoff, Chairman, Fred J. Bowers, Co-chairman and David P. McAlindin. The time and thought devoted by this group and the efforts and ability of Dr. Schmitt and his colleagues made this course the success that it was.

The Educational Committee for the coming year will be headed by Fred J. Bowers and David McAlindin will be co-chairman.

The list of those who attended is as follows:

Walter Blank, Abalene Pest Control Service, Inc., Poughkeepsie, N. Y.
Fred J. Bowers, Bowco Laboratories, Rahway
Walter J. Boyce, Economy Exterminating Co., Hightstown
Robert Campbell, Vogel-Ritt of New Jersey, Inc., Trenton
I. Drucker, Banex Exterminating Co., Inc., New York, N. Y.
Alex. Ehrlich, J. C. Ehrlich Co., Reading, Pa.
Morris Feldman, Columbia Exterminating Co., New York, N. Y.
J. L. Geisman, Sanitary Exterminating C., Jersey City
L. Y. Goldman, New England Pest Control Co., Providence, R. I.
Frank Guenther, Western Exterminating Co. Of Pa., Philadelphia, Pa.
Joseph R. Hynack, Scranton, Penna.
Franz K. Kahler, Aardvard Pest Control, Plainfield
D. P. McAlindin, Royal Exterminators, Hoboken
John K. Medoff, Hudson Exterminating Co., Inc., West New York
John Mitchell, Western Exterminating Co., Inc., Washington, D. C.
L. A. Moore, L. A. Moore Co., Inc., Utica, N. Y.
Edward Pilat, Chemical Exterminating Co., Newark
J. Edwin Sameth, Western Exterminating Co., Inc., Newark
Thomas A. Skelly, Western Exterminating of Atlantic City, Atlantic City
Frederick I. Smith, United Chemical & Exterminating Co., Jersey City
Bernard Stegman, Arrow Exterminating Co., Rockaway Beach, L. I.
H. Stucker, United Chemical & Exterminating Co., Jersey City
Robert R. Thompson, Rutherford
William Waack, North Jersey Termite Co., Bloomfield
Chester A. Watson, Mohawk Carpet Mills, Inc., Amsterdam, N. Y.
R. H. Young, Paterson
August Hiemenz, L. A. Moore Co., Inc. Utica, N. Y.

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POWDER POST BEETLES
and Their Control

BY IRA HATFIELD

CONSULTANT

Wood Preservation, Monsanto Chemical Company

GUIDE TO READING

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THERE ARE TWO general types of insects which are important enemies of timber. Termites — dry wood, damp-wood, and subterranean — belong to one type; the other type consists of various families of beetles belonging to the order Coleoptera, of which four families are of primary importance in the United States. These four families are the Anobiidae, (Furniture and Death-Watch beetles), Bostrichids (False or Large Powder-Post beetles), Lyctidae (True Powder-Post beetles), and the Cerambycidae (Longhorn beetles).

The purpose of this article is to give information on the biology of these beetles and describe the damage done by representative members of these families of beetles. Information on methods of control with a discussion of the relative merits of each will also be given.

GENERAL LIFE HISTORY

A GENERAL life history of Coleoptera beetles is given diagrammatically in Figure 1. Since the size and shape of the various stages varies according to the beetles involved, no attempt is made to represent the stages by drawings or pictures in this general diagram. Specific information will be given as the particular members of the Order are discussed.

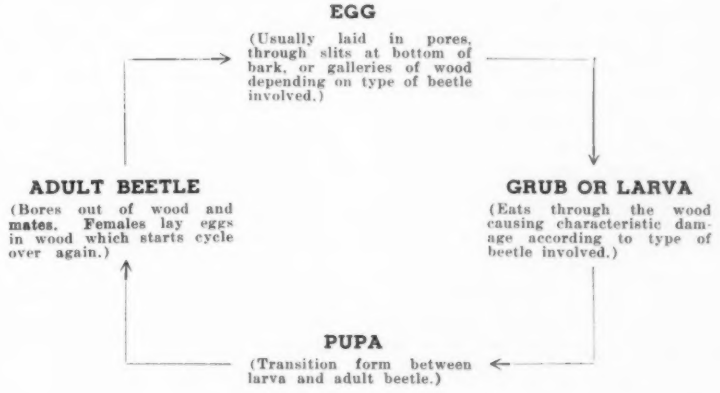

EGG
(Usually laid in pores, through slits at bottom of bark, or galleries of wood depending on type of beetle involved.)
ADULT BEETLE
(Bores out of wood and mates. Females lay eggs in wood which starts cycle over again.)
GRUB OR LARVA
(Eats through the wood causing characteristic damage according to type of beetle involved.)
PUPA
(Transition form between larva and adult beetle.)

Figure 1 Diagrammatic Representation of the Life Cycle of Certain Beetles Belonging to the Order Coleoptera.

The author wishes to especially express his gratitude to Mr. R. A. St. George and Dr. Craighead of the Bureau of Entomology and Plant Quarantine, U. S. D. A. for their invaluable assistance with the manuscript and illustrations, and to others who reviewed the manuscript.

Courtesy USDA, Bur. Ent. & Pl. Q.

Figure 2. Eggs of *Nicobium hirtum* (Ill.) laid in exit hole in the wood (Highly magnified).

A. ANOBIID BEETLES (Furniture and Death-Watch Beetles)

BIOLOGY: The EGGS of Anobiid beetles are laid in cracks or crevices or in old emergence galleries, preferably in old wood (Figure 2). They hatch in a few weeks and the grubs or larvae begin to burrow or tunnel into the wood.

The LARVAE can live in both coniferous and hardwood material and in either heartwood or sapwood. Since the larvae may vary in appearance according to their age, only mature larvae will be described. The full-grown larvae are curved and wrinkled, and some of the folds on the body have rows of tiny dark-brown spinules or asperities ("hairs") which probably help the grubs move in their tunnels (Figure 3). The larvae have three pairs of short five-jointed legs. Their mandibles are usually dentate or toothed on the inside margin of the cutting edge. Although the larvae vary in size depending upon age and species, in general the full grown larva of the common furniture beetle *Anobium punctatum* (DeG) is about 1/4 inch in length, whereas the average length of the death-watch beetle *Xestobium rufovillosum* (DeG) larva is about 2/5 inch.

The larvae may work in the wood from one to several years. When they become full grown, they tunnel toward the surface of the wood, and there construct an oval cell in which they PUPATE (a resting stage which partly resembles the larva and partly the adult) and then transform into an adult beetle. This period of transformation may take two or three weeks, after which the beetles may bore to the surface of the wood and escape, or, if it is winter, they may remain as adults in the wood until more favorable conditions for emergence exist.

The ADULT BEETLES usually appear in the warm summer months but can appear at any time when temperature and moisture conditions are favorable. The adult furniture beetles vary in size according to species, ranging from 1/10 to 1/5 inch in length (Figure 4). They vary from reddish- to blackish-brown in color. The death watch beetles are somewhat larger, averaging 1/4 to 1/3 inch in length, and are brown to dark brown in color.

Examples of Anobiid Beetles

Examples of the old furniture beetles are:

Anobium punctatum (DeG.)
Nicobium hirtum (Ill.)

Examples of the Death Watch beetles are:

Xestobium rufovillosum (DeG.)
Hadrobregmus carinatus (Say)
Hadrobregmus gibbicollis (Lec.)

Other Anobiid beetles are:

Trypopitys sericeus (Say)
Xyletinus peltatus (Harris)

Characteristic Damage

The conditions of wood inhabited by Anobiid beetles depends upon the age of the infestation and the extent of the damage done. In the early stages of attack, the galleries (which are never visible on the outside of uncut wood), usually follow the grain of the wood, i. e., they will be found only in the softer rings (springwood) of the wood. As the infestation spreads, the larvae cut across the grain, giving the wood a honeycombed effect. As the larvae mature into adult beetles, they emerge from the wood, leaving circular exit holes which range from 1/16 to 1/8 inch in diameter (Figure 5).

The galleries produced by the larvae are packed with excreta. This excreta consists of small pellets of partly digested wood. In some species the pellets are somewhat bun-shaped, in others

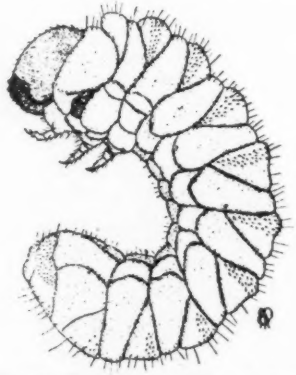


Figure 3. Full grown larva of Anobiid beetle *Xestobium rufovillosum* (DeG). (About 7 times enlarged.) (After Parkin).

they are elongate (Figure 6). They need not, however, be confused with the pellets of dry-wood termites, for the pellets of the Anobiids taper at each end, they do not all have the same uniform shape, and they lack characteristic markings. In contrast, the pellets of dry-wood termites have rounded ends and are sculptured or marked with longitudinal depressions (Figure 7).

Control of Anobiids

UNFORTUNATELY, the work of many wood-inhabiting insects is not discovered until the damage is well advanced. Since it is difficult to convince the public of the value of chemically treating wood as a preventative measure, the control of wood inhabiting insects usually centers around the treatment of wood already infested if not badly riddled by the insects.

Since the Anobiid beetles require rough surfaces in which to lay their eggs, it has been found that wood which has its pores filled with paint, varnish or other agents *before* the infestation takes place, will be less subject to attack than unfinished, rough wood. This suggests that the unfinished surfaces of desks or other furniture could be so treated with pore fillers as to prevent attack if the manufacturers desired to do so or if the public would demand it.

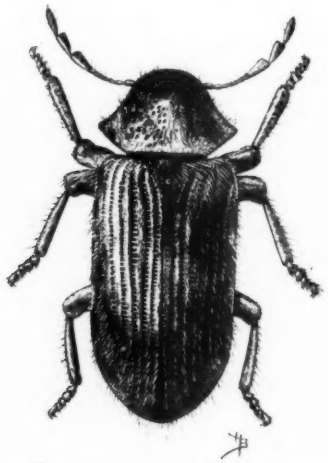
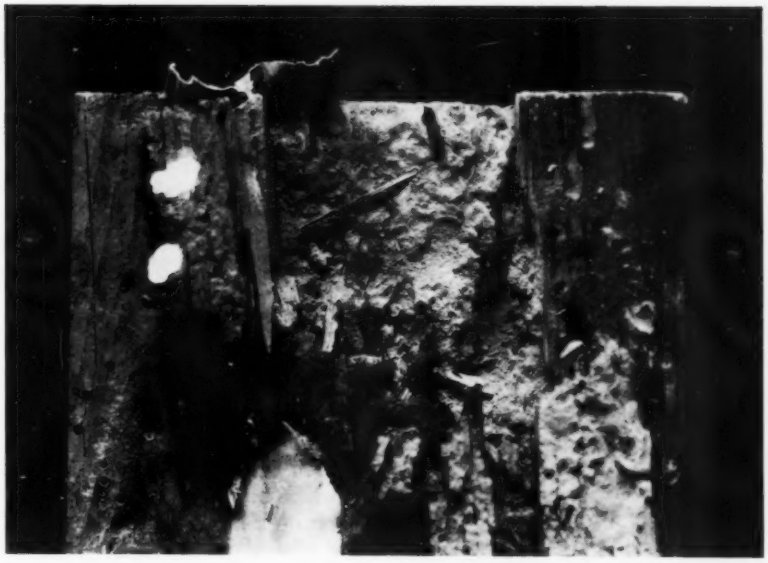


Figure 4. Drawing of Anobiid powder-beetle *Nicobium hirtum* (Ill.) (After Bailey.) (About 27 times actual size.)



Courtesy USDA, Bur. Ent. & Pl. Q.

Figure 5. Two views of damage done to pine sills of house by *Trypopitys sericeus* (Say.)

In view of the fact that preventative measures are seldom taken, our discussion of control of Anobiid beetles might be divided into their control in "stationary" habitats such as the woodwork of buildings and their control in "movable" objects such as furniture, implements, etc. In buildings, structurally weakened timbers or other items should be replaced, preferably with wood treated with chemicals known to be effective in controlling the beetles. Although kerosene or other petroleum oils, orthodichlorobenzene, and trichlorobenzene have been suggested for this use, because of their relatively rapid volatilization, they do not possess lasting qualities and therefore do not give more than temporary protection.

The most useful material found to date for treating wood in place consists of a 3% to 5% solution of pentachlorophenol in petroleum oil. This material may be applied by brushing or spraying, the latter generally being more successful. (For general remarks on treating methods, see information given under the heading — Killing Beetles and Larvae in Infested Wood, — in the latter portion of this article.)

For treating "movable" objects such as lumber, furniture, implement handles, etc., chemical applications may be practicable, or heat treatments can be used if heat chambers are available. Pentachlorophenol in suitable petroleum oils is probably the most useful chemical for treating seasoned wood; the method of application depending upon the items treated. Naturally, implement handles, gun stocks, etc. would be dipped, whereas furniture would have to be brushed or sprayed. Since heat treatments must either be severe or of long duration if lower temperatures are used, the applicator must recognize the danger of warping the wood, loosening the glue joints, or otherwise adversely affecting the wood. (For heat treating schedules, see heading — Killing Beetles and Larvae in Infested Wood).

B. BOSTRICHIDS
False or Large Powder-Post Beetles

BIOLOGY: The EGGS of Bostrichid beetles are not laid in surface cracks or crevices in the wood as in the case of the Anobiids, but rather the adult beetles bore into the wood and the female lays her eggs in egg tunnels or pores leading from them. The tunnels are prepared by the adult

Courtesy USDA, Bur. Ent. & Pl. Q.

Figure 6. Elongate excreted pellets of digested wood from burrows of Anobiid beetle *Nicobium hirtum* (Ill.) (Enlarged about 9 times.)

beetles. The egg-tunnel system is kept free from "wood dust," or frass, whereas the tunnels cut by the larvae that hatch from the eggs contain wood dust.

The LARVAE of Bostrichids are found primarily in the sap-wood of hardwood species, although the sapwood of softwoods is not immune to the attack of certain species of Bostrichids. In general, the larvae tend to move only in a longitudinal direction in the wood, eating their way in the sapwood. The full grown larvae are curved and wrinkled, are yellowish to white in color, and lack "hairs" or spinules (asperites) on the upper surface of their bodies. The spiracles are all about the same size, the last or posterior pair not being larger than the others (Figure 8). They have three pairs of five-jointed legs. The brown jaws (mandibles) of the larvae are not dentate but gouge-like and rarely toothed on the inside margin of the cutting edge.

The larvae depend upon starch for their development, and the length of their existence as larvae is therefore dependent upon their food supply. When full grown the larvae pupate, after which they transform to beetles and bore to the surface of the wood and emerge.

The ADULT BEETLES are generally larger than the Lyctids, ranging from 1/8 to 1 inch in length compared to 1/6 inch or less for the Lyctids. They are generally dark-brown to black in color, although there is variation here too as is exemplified by *Xylobiops basilaris* (Say.) which has reddish shoulders or markings on its wing covers. Some of the characteristics which help in the identification of some of the Bostrichids are their cylindrical body and the

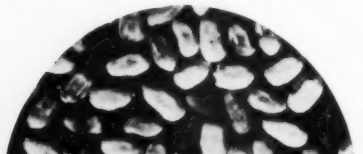


Photo by N. Piesbergen.

Figure 7. Pellets of dry-wood termites showing rounded ends and longitudinal depressions. (Enlarged about 9 times.)

spine-decked, roughened thorax which covers the head (Figure 9). The antennae end in a three-jointed club.

Examples of Bostrichid Beetles

Xylobiops basilaris (Say.) — Red-shouldered shot-hole borer.
Polycaon stouti (Lec.)
Dinoderus minutus (Fab.)

Characteristic Damage to Wood

Because both the adult beetles as well as the larvae bore into the wood, the galleries formed vary in size and shape. The holes found in the wood are circular in shape and vary from 1/8 to 3/8 inch in diameter. The irregular longitudinal burrows made by the larvae are filled with frass which varies from a very fine to a course texture, and tends to stick together rather than fall apart as "dust."

As previously mentioned, Bostrichids work primarily in the sapwood of hardwoods, especially ash, oak, and hickory which are ring-porous in structure.

Control of Bostrichids

IT WILL be unnecessary to discuss control measures here, for the same general remarks given for the control of Anobiids applies here. The reader is therefore referred to the control methods given for Anobiids and the general heading at the close of the article entitled — Killing Beetles and Larvae in Infested Wood.

C. LYCTIDAE
True Powder-Post Beetles

BIOLOGY: Because of the widespread damage done by Lyctid beetles, our knowledge of the life cycle of these beetles is much more complete than for certain related beetles. Intensive studies have been made of the conditions which favor attack of the wood, of the

USDA Farmers' Bulletin 1582

Figure 8. Photograph of larva of the Bostrichid beetle *Xylobiops basilaris* (Say.) ((Enlarged 9 times.)

length of time required to complete the life cycle of different species, and of control methods. The EGGS of Lyctid beetles are long, oval or cylindrical, and usually have a conical cap which may be drawn out into a strand or may be stubby or practically absent altogether (Figure 10). They are "pushed" into the surface pores of wood by the female's ovipositor, the depth to which they are deposited depending upon the species of beetle involved. Since the pore depth is important to the insect, and since pore sizes vary in different species of wood, this helps ex-

Courtesy USDA, Bur. Ent. & Pl. Q.
Figure 9. Photograph of the red-shouldered shot-hole borer *Xylobiops basilaris* (Say.) (About 10 times natural size.)

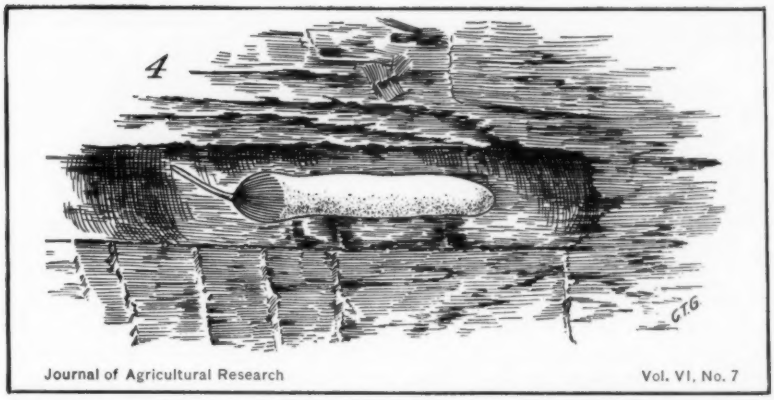
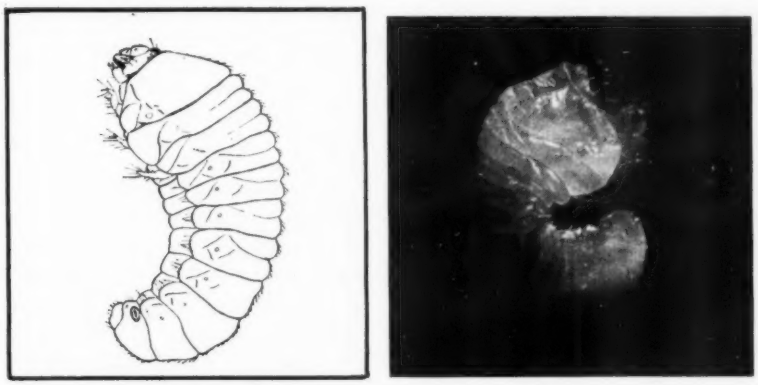


Figure 10. Drawing of *Lyctus* beetle egg showing conical cap and strand (After Greene). (About 50 times actual size.)

plain why certain kinds of wood are attacked by certain species of *Lyctus* beetles. Thirty to fifty eggs are laid by a female beetle, and these eggs, under favorable conditions, hatch in from six to fifteen days. The hatching process follows this general order: The posterior end of the egg shell is ruptured and the young larvae backs out of the egg "case" or "shell." The young larva works backward through the opening, while feeding on the egg yolk present in the anterior end. When free from the egg shell, the young larva starts feeding on the wood cells, and tunnels away from the surface of the wood. At first the larvae are straight-bodied, but soon after leaving the egg the body becomes curved.

The LARVAE of *Lyctus* beetles are white in color except that the head is dark brown and the mandibles are brownish to black. The anterior end is relatively larger than the posterior end, and the *Lyctus* larva can be distinguished from the larvae of other wood boring insects because the last (eight) pair of spiracles are much larger than the other spiracles (Figure 11a and 11b). The Lyctid larvae have three pairs of three-jointed minute legs on the anterior portion of their bodies.

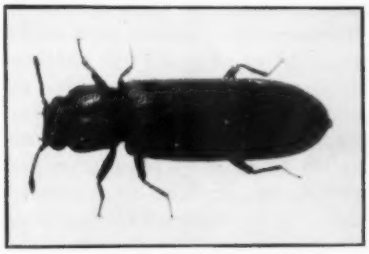
The length of time the larval stage exists depends upon the starch content of the wood and environmental conditions, but it is now known that certain species such as *Lyctus parallelopipedus* (Melsh) can complete their entire cycle in a little less than three months under ideal conditions, whereas other species such as *Lyctus planticollis* (Lec.) require from four to nine months or longer.



a. Journal of Agricultural Research, Vol. VI No. 7
b. Courtesy USDA, Bur. Ent. & Pl. Q.
Figure 11. a. Drawing of *Lyctus* larva showing enlarged eighth spiracle. (Approximately 20 times natural size.)
b. Photograph of *Lyctus* larva. (Approximately 20 times natural size.)

When full grown, the larvae usually bore to within an 1/8 inch of the wood surface, and there make small cylindrical pupal chambers where they pupate and then change to adult beetles. It may take from two to three weeks to transform from the larval stage to the adult beetle stage.

The ADULT BEETLES bore their way to the wood surface, and as they emerge from the wood, some frass or wood dust is pushed out of the holes formed by the adults. The adult beetles are small, ranging in size from about 3/32 to 7/32 inch in length. They are reddish-brown to black in color, and have a flattened appearance (Figure 12). The thorax does not form a hood over the head, which distinguishes them from the Bostrichids. The adult beetles have fine hairs (pubescence) on their wing covers, and the arrangement of this pubescence helps distinguish the species. In the case of



Courtesy USDA, Bur. Ent. & Pl. Q.
Figure 12. Photograph of Adult *Lyctus planicollis* (Lec.) (Enlarged about 16 times.)

L. planicollis, the pubescence occurs in straight lines up and down the wing covers, while in *L. parallelopipedus*, the pubescence is scattered over the entire wing cover surface and is more dense.

Although the adults which emerge from the pupal stage bore their way to the surface of the wood, the adult females do not bore into the wood to lay their eggs. The eggs are laid in pore surfaces, thus differing in this respect also from the Bostrichids.

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Figure 13. Photograph of larva of roundheaded borer *Megacyllene antennatus* (White). (Enlarged 3 diameters.)

The beetles are able to fly, and this helps extend the range of their damage. Mating occurs soon after the adults emerge from the wood, and the females soon become active in their egg-laying. The average life of the adults is about four weeks, during which time their feeding on the wood is negligible.

Examples of Lyctus Beetles

Lyctus planicollis (Lec.)
Lyctus parallelopipedus (Melsh)
Lyctus brunneus (Steph.)
Lyctus cavicollus (Lec.)

Characteristic Damage to Wood

The appearance of wood infested by Lyctids depends upon the age of the infestation and also upon the species of beetle involved. Lyctids have not been found either in poorly seasoned lumber (moisture content above 40%, oven dry basis), or in wood which has a moisture content below 8%. Furthermore, they do not tend to attack old wood as do the Anobiids. They are most often found in such places as newly laid hardwood floors, in stored merchandise such as the handles of tools or sports goods, or in furniture squares, gun stock blanks, wagon wheels, etc.

Infested timber can usually be detected by the presence of small piles of frass (wood dust) on the floor surfaces or beneath wood areas attacked by the beetles. The frass usually appears during the period while the larvae are actively working in the wood. It is pushed out of small holes which the larvae make in the surface of the wood.

In the early stages of attack, the larvae eat only along the grain of the wood and primarily in the springwood, but later the tunnels run in any and all directions, and the entire sapwood can be reduced to powder. The galleries of the larvae are always packed solidly with frass.

The exit holes made by the adult beetles range in size from about 1/32 to 1/16 inch in diameter. In leaving the wood, the adults may bore through varnish, paint or other coatings, through fabric and other types of floor coverings, and even through metal coverings.

Control of Lyctids

IT IS generally impractical to recommend that wood with a low starch content or wood with pore sizes which will not accommodate the eggs, be selected for use. Likewise, burning infested wood is only practical under certain conditions. Since the infestation is often not discovered until the wood is in use and damage has occurred, the problem often becomes one of stopping further damage before the wood is completely destroyed. To be sure, timbers or other wood members riddled to the extent that their strength is impaired, will require replacement with sound wood.

Filling pores of susceptible but uninfested species of wood with varnish, paint or wax aids in preventing the adult beetles from laying eggs in the wood pores. In treating infested wood, it is always desirable to remove the boring dust (frass) from the wood surfaces before applying chemicals. Otherwise, this exterior material will absorb much of the solution that would otherwise soak into the frass in the galleries in the wood. Furthermore if all visible boring dust is removed before treatment and then fresh dust reappears on the wood surface, it indicates that control has not been complete.

Methods of applying control chemicals to infested wood will vary according to where the wood is and how easily accessible it is for treating. Naturally, desks, cabinets or other hardwood furniture can be sprayed with chemicals or given a heat treatment if such a method seems more practical, but hardwood floors or other stationary items must be treated in place. Although a general discussion of control measures will be given in a later section of this article, the importance of treating hardwood floors, etc. for control of powder-post beetles warrants some discussion here.

To date, the most practical method of treating infested hardwood floors is to apply an oil solution of pentachlorophenol to the floor by means of a spray. In some cases, 15% by volume of trichlorobenzene has been added to a 5% solution of pentachlorophenol, and with good results. Brushing tends to "roll" the varnish and should not be used. Mopping is likewise not recommended. If the spray solution is applied by means of a spray under low pressure and with the nozzle about three inches from the surface of the wood, generally good results have been obtained. Application should be made from one corner or side of the room and the application made so that the operator does not have to walk on treated areas. Likewise, the occupants of the house should not use the room until the solvents have volatilized and the floor is again "dry." Applications should be thorough, but not so heavy that the solution runs between the boards or "lakes" or "puddles" on the floor.

There are many kinds of floor finishes and each may react differently to oil solutions. It is therefore always desirable to apply a small amount of spray solution in an inconspicuous place such as an area covered by a rug, and observe the effects before the total surface is treated.

Operators should also be warned against breathing the vapors of pentachlorophenol or allowing them to contact the skin as they are irritating. They should also avoid fire hazards. It should be recognized that spray equipment

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Figure 14. Adult female beetle and egg of Longhorn beetle *Chion cinctus* (Drury). (About actual size.)

should be equipped with synthetic rubber gaskets and hose to avoid deterioration from the oils.

The Pest Control Operator can be put to a great deal of expense if he sells his beetle control services on other than the owner's own risk basis. It is difficult to say that no damage will occur to the floor finishes, that none of the spray solution will run through the cracks between the flooring in an upstairs room, and that it will not stain plaster, wall paper, etc. The owner must balance the possible bad effects against the damage being done by the beetles, and decide whether he prefers control or floor replacement.

For further comments on control, see heading — Killing Beetles and Larvae in Infested Wood.

D. CERAMBYCIDAE
Longhorn Beetles

BIOLOGY: The EGGS of Longhorns vary in shape, being oval, long, or spindle-shaped. They are glassy-white, and have small pits or markings on their surface. These eggs are laid mainly in cracks or crevices in bark, which means that the beetles are usually of interest to the Pest Control Operator only because they have been introduced into homes constructed with wood containing bark on some of its edges. The exception to this general statement is exemplified by the *Chion* adults which lay their eggs on the surface of the bark or wood even if crevices are not present. The eggs may hatch in a few days after laying, or a longer time may be required if climatic conditions are not ideal.

The LARVAE of Longhorns need never be confused with the larvae of other powder-post beetles, for they are easily distinguishable and are all quite similar in general shape and appearance. The larvae or grubs are long and narrow and are a light cream color. The body is composed of a number of rings or segments, generally tapering somewhat from front to rear (Figure 13). The head does not appear to be a separate segment, due to the fact that it is often partly withdrawn into the first body segment. Often the only distinguishable features of the head are the heavy dark-brown jaws. Although many of the larvae are legless, some have a pair of (very minute, short) legs on the lower surface of each of the first three segments behind the head. Also, some of the segments contain "warts" or "bumps" which undoubtedly aid the larvae in moving in the tunnels. The full grown larvae vary from 1/2 to 3 or 4 inches in length, depending upon the specie.

Although most Longhorn beetles seem to prefer moist wood for their most rapid development, the larvae may continue to live in seasoned wood for many years. It is because they may live in wood-in-use for long periods of time that the Pest Control Operator may come in contact with these beetles. Likewise, more and more poorly seasoned lumber is finding its way into buildings, and it is not uncommon for beetles to emerge from infested wood in houses only one or two years old.

Considerable damage can be done by the larvae during their active period. As the larvae reach full maturity, they PUPATE and then transform to beetles. At the time of pupation, the mature larva gnaws a special chamber in the wood and there goes through its pupal and adult changes, which usually requires a relatively short period of three to four weeks.

The ADULT Longhorn beetles are large, conspicuous insects ranging from 1/4 to 3 inches in length, and are easily distinguishable by the length of their "horns" or antennae. In some species the antennae of the males may be much longer than the body itself (Figure 14). Many of the species contain conspicuous color markings, which are bound to attract attention. One of the most common Longhorn beetles is the old house borer. It is 3/4 to 1 inch long and is black with grey markings on its wing covers which appear as two transverse grey bands.

Examples of Cerambycidae (Longhorn) Beetles

Smodium cucujiforme (Say.) — Flat oak borer or flat powder-post beetle.
Neoclytus caprea (Say.) — Grey banded ash borer.
Neoclytus acuminatus (Fab.) Red-headed ash borer.
Chion cinctus (Drury)
Romaleum rufulum (Hald.)
Hylotrupes bajulus (L.) — Old house borer.
Megacyllene antennatus (White) — Round headed borer.

Characteristic Damage to Wood

As previously mentioned, damage to timbers by Longhorn beetles is caused entirely by the larvae; the adult beetles do not bore into the wood. Since the Pest Control Operator is primarily interested in the damage done to structual timbers, the description of the damage will be confined to that of wood in use. In general, damage is confined to the sapwood but in species of wood such as ash and hickory in which the sapwood and heartwood are not closely defined, the damage may be found in all portions of the wood. The galleries produced by the Longhorn larvae are irregular and packed with frass which varies from flour-like powder in the case of some species to very coarse frass in other species.

Because there is such a variation in the size of the Longhorn beetles and larvae, it is difficult to accurately describe the type of damage done by each unless the damage is described for each particular species. Likewise, the exit holes vary greatly in size according to species, ranging from round

holes 1/8 inch in diameter to round holes as large as 1/2 inch in diameter.

Wood containing some bark is often attacked, and the holes in the bark or the engravings on the wood where the bark has dropped-off help identify and locate the damage.

Control of Cerambycidae

SINCE damage by some Longhorn beetles like the ash borers, originate in green or partly seasoned wood, control of these insects must start in the forest or at the sawmill seasoning yard. In cases where this type of Longhorn beetle appears in old houses or around the household, re-infestation is not likely unless more freshly cut or partially seasoned wood is present. To aid in preventing infestation by some other species of beetles, the bark should be removed from the edges of boards or from logs in cabins attacked by Longhorn beetles. On wood where bark is absent, application of chemicals is usually unnecessary, but if the client demands that the wood be given a treatment, oil solutions of pentachlorophenol are most likely to succeed in killing the adults and larvae and in preventing re-infestation.

In the case of Longhorn beetles like the "flat oak" and "old house" borers that attack seasoned wood, it has been observed that these beetles are controlled by a preservative treatment such as 5% pentachlorophenol in oil. Since specific suggestions on methods of treatment of infested wood have been given previously and will be more fully discussed in the section entitled — Killing Beetles and Larvae in Infested Wood, further specific comments on wood treatment will not be given here.

PREVENTATIVE AND CONTROL MEASURES

Preventative Measures

In general it is difficult for the Pest Control Operator to aid the client in *preventing* beetle damage to wood since the client generally is not aware of the necessity for protection until damage has already occurred. If the client would be careful in buying wood products, whether it be a home or furniture, undamaged wood could often be obtained. In normal times, the client might insist on buying sound well seasoned wood — wood which contained no bark, or wood that has all surfaces painted or the pores filled or that was chemically treated, — but the cost would be high. In general, preventative measures must be taken by the sawmill, the lumber yard, or the furniture manufacturer, and since these are generally out of the control of the client, methods of controlling damage will be of greatest interest to the client.

TABLE I. SCHEDULE FOR HEATING WOOD TO CHECK DAMAGE BY POWDER-POST BEETLES

Relative humidity (per cent)	Lethal temperature required	Thickness of timber	Time required to overcome lag after kiln has attained lethal temperature	Additional margin of safety	Time then held at lethal temperature	Total period of exposure after kiln has attained required conditions
	°F	Inches	Hours	Hours	Hours	Hours
100	130	1	½	½	1½	2½
		2	2	½	1½	4
		2½	3¼	½	1½	5¼
		3	4½	½	1½	6½
	125	1	½	½	2	3
		2	2	½	2	4½
		2½	3¼	½	2	5¾
		3	4½	½	2	7
80	120	1	½	1½	6	8
		2	2	1½	6	9½
		2½	3¼	1½	6	10¾
		3	4½	1½	6	12
	115	1	½	7½	30	38
		2	2	7½	30	39½
		2½	3¼	7½	30	40¾
		3	4½	7½	30	42½
	125	1	½	1	4	5½
		2	2	1	4	7
		2½	3¼	1	4	8¼
		3	4½	1	4	9½
	120	1	½	2	7	9½
60		2	2	2	7	11
		2½	3¼	2	7	12¼
		3	4½	2	7	13½
	115	1	½	9	36	45½
		2	2	9	36	47
		2½	3¼	9	36	48¼
		3	4½	9	36	49¼

Killing Beetles and Larvae In Infested Wood

There are three methods that have been advocated for killing wood-boring beetles and larvae in infested wood. One method consists of kiln drying the wood or of using heat chambers. Kiln drying can generally be practiced only by mills or wood-working plants, but heat chambers are sometimes used by Pest Control Operators for the treatment of furniture and other small items. When heat chambers are used there is always the possibility of damage due to the loosening of joints, warping of wood or the raining of fabrics or finishes. Where heat treatments are used, it is necessary to give consideration to the temperature used, the humidity in the chamber, and the thickness of the wood. This latter factor influences the heating period required, as there is a lag between the heating-chamber temperatures and the temperatures through the wood.

The fundamental work of Snyder and St. George and its extension by Fisher and Parkin to include stock of varying thicknesses and kiln temperatures was combined into one table by St. George as shown in Table I.

It has been reported that fumigation with certain chemicals has been effective for killing beetles and larvae in infested wood. Although the Pest Control Operators have reported satisfactory results with cyanide and chloropicrin, the writer has been unable to find direct literature citations to guide in recommending time or concentration requirements.* It has been stated that for fumigating with methyl bromide, 2 cubic centimeters of liquid gas per cubic foot

* Fumigations in California for controlling dry-wood termites is being actively studied, and it is hoped that careful work can also be conducted on fumigating to control powder-post beetles.

of chamber space for 18 hours at 80°F be used for killing insects in 2 inch or smaller sizes of wood.

Methods of Applying Chemicals To Wood

Probably the most useful method available for the Pest Control Operator is the use of chemical dips or sprays. Since the PCO generally does not work with infested wood until it is in the consumer's possession, the materials infested are generally so located that dips cannot be used. This leaves chemical sprays as the most useful control method. Since water soluble chemicals are generally impractical, ortho-dichlorobenzene, trichlorobenzene, dinitrocyclohexylphenol, and pentachlorophenol have been advocated from time to time. The first two chemicals are sufficiently volatile so that they do not give long time protection and dinitrocyclohexylphenol imparts a yellow color to wood and therefore limits its use. This means that pentachlorophenol is probably the most useful chemical yet discovered. It is generally used at a concentration of 5% by weight in a suitable petroleum solvent, the formulation being designed to prevent crystallization (blooming) of the pentachlorophenol on the surface of the treated wood as the solvent volatilizes.

In practically all cases it is advantageous to spray the chemicals on the infested areas as a more thorough job can be done without adversely affecting the finish. Whereas varnished and painted surfaces might be ruined by brushing pentachlorophenol solutions onto wood, spray treatments when carefully applied penetrate the wood without "roughing" the finish. Where sub-floors, floors, joists, or girders are sprayed, it has been generally found that a nozzle which delivers a conical type spray is most useful. Likewise it has been found that the spray nozzle should be held about 3 inches from the surface being sprayed. If held closer than 3 inches the solution "bounces off" the wood; if held farther away than 3 inches the spray fogs and much is lost. Where hardwood floors are to be treated, the operator should start in a corner or a side of a room away from the door and work toward the door so that he will not have to walk on the treated areas. In general 24 to 48 hours should elapse before anyone walks on the treated floors. Applications should be made so that the surfaces are adequately "wet" with the solution but there should not be so much solution applied that the material "puddles" or "lakes" on the floor surface.

Precautions

Now a few precautions on the use of pentachlorophenol solutions. In all cases the operator applying pentachlorophenol solutions should be adequately protected against the vapors or mists or the spray solution. In general, goggles should be worn and synthetic rubber gloves should be provided, and a respirator is often essential to an operator's comfort. Any petroleum solvent, regardless of whether it has a low or high flash point, presents a certain degree of fire hazard. Smoking should not be allowed around the premises and care should be taken that open flames are not present. The mist from the spray should be kept off lighted electric blubs as the droplets that fall on the hot glass make pin-point holes in the bulbs and thus burn them out quickly.

It is always desirable, if a finished floor is to be treated, to try a small floor section before the entire area is treated. Such an area may be located in an "under the rug" area or some other inconspicuous place. It must be recognized that there are almost as many floor finishes (varnishes, lacquers, paints, waxes, stains, etc.,) as there are floors, and it is impossible to make a definite statement relative to the possible damage that might be done by a spray solution. Likewise, care must be exercised that a spray material is not applied so heavily that it runs down through the floor cracks and thus stain plaster or other areas immediately underneath the treated floor.

It is also good practice to acquaint the client with the fact that wood preservation chemicals have odors, and that these odors may persist for a certain period of time. By giving them this advance warning, dissatisfaction can easily be prevented.

It should be mentioned that the spraying of oil solutions in basements or other areas where ventilators are present in the foundation, or the treatment of floors in the house with the windows open, may make it possible for the tiny oil droplets to "drift" out of the openings and on to the shrubbery outside the house. If 5% pentachlorophenol in oil hits such shrubbery it can very easily be the cause of leaf drop or killing of the plants. Extreme care in preventing this "drifting" should be exercised by the Pest Control Operator.

These precautions might make a Pest Control Operator feel that there is too great a hazard connected with the use of chemical spray solutions. Experience has shown, however, that when solutions are carefully applied and when the client is taken into the Pest Control Operator's confidence, good results have been obtained and with a minimum amount of client dissatisfaction. Chemical tools are only as useful as the skill of the workman handling such tools and the skill of the salesman who contacts the client.

BIBLIOGRAPHY

Anon. The Kiln Sterilization of **Lyctus**-infested Timber. Leaflet 13. Forest Products Reasearch Laboratory, Princes Risborough, Aylesbury Bucks, England. 1938.

Anon. Beetles Injurious to Timber and Furniture. Department of Scientific & Industrial Research. Forest Products Reasearch Bulletin No. 19. 36 pages. Illus. 1940.

Boving, Adam G. and F. C. Craighead. An Illustrated Synopsis of the Principal Larval Forms of the Order Coleoptera. Monograph published by Brooklyn Entomological Society. (Out of Print). 351 pages, 125 plates. Brooklyn, N. Y. 1931.

Cann, F. R. Experiments in Great Britain with Wood Preservatives for the Prevention of Lyctus attack. Forestry 14 (1): 27-30. 1940.

Christian, M. B. Chemical Dips Tests against Lyctus Powder-Post Beetles. Southern Lumberman 159 (2000): 105-109. 1939.

Christian, M. B. Lyctus Beetle Damage Prevention. Southern Lumberman 16 (2021): 47-49. 1940.

Christian, M. B. Biology of the Powder-Post Beetles, **Lyctus planicollis** LeConte and **Lyctus parallelopipedus** (Melsh.) Part 1. Louisiana Conservation Review 9 (4): 56-59. 1940.

Christian, M. B. Powder-Post Beetles and Their Control and Notes on Chlorinated Phenols as Soil Poisons for Termite Control. Pests and Their Control 13 (6): 20. 1945.

Cummings, J. E. and J. B. Wilson. The Preservation of Timber Against the Attacks of the Powder-Post Borer (**Lyctus brunneus** Stephens) by Impregnation with Various Chemicals. Jour. Council for Sci. & Ind. Res. 9 (1): 37-56. 1936.

Fisher, Ronald C. **Lyctus** Powder-Post Beetles. Department of Scientific & Industrial Research. Forest Research Bulletin No. 2. 46 pages. Illus. 1922.

Fisher, Ronald C. Timbers and Their Condition in Relation to **Lyctus** attack. Forestry 2 (1): 40-46. 1928.

Fisher, Ronald C. Chemical Preservation of Timber — The Control of Wood-Boring Insects. The Chemical Age 52 (1348): 373-378. 1945.

Fisher, R. C., F. R. Cann, and E. A. Parkin. A Survey of the Damage Caused by Insects to Harwood Timbers in Great Britain. Dept. Sci. and Ind. Res. Forest Products Research Bull. No. 16. pp. 1-27. 1932.

Kofoid, Chas. F., et al. Termites and Termite Control. U. of Calif. Press. Second Ed. Revised. Berkeley 1940. (Especially Chapter 32 by Edwin C. Van Dyke entitled "Wood Boring Insects Whose Appearance or Workings Resemble those of Termites") pp. 351-363.

Krogh, P. M. D. and F. G. C. Tooke. Pentachlorophenol Solutions for the Preservation of Wood. Farming in South Africa. Vol. 20; pages 761-769, Pretoria, South Africa. 1945.

Linsley, E. Gorton. The Recognition and Control of Death-Watch, Powderpost and False Powderpost Beetles. Pests and Their Control 11 (3): 11-14, 23-25. 1943.

Maxwell-Lefroy, H. The Treatment of the Death-Watch Beetle in Timber Roofs. Jour. Royal Soc. of Arts. 72 (3720): 260-266. 1924.

St. George, R. A. Protection of Log Cabins, Rustic Work and Unseasoned Wood From Injurious Insects. U. S. D. A. Farmers' Bulletin No. 1582. 22 pages. Illus. 1943.

Snyder, T. E. Powder-Post Beetles and Their Control. Pests and Their Control 12 (4): 8, 27-31. 1944.

Snyder, T. E. Defects in Timber Caused by Insects. U. S. D. A. Bulletin 1490, pp. 1-47. 1927.

Snyder, T. E. Preventing Damage by Lyctus Powder-Post Beetles. U. S. D. A. Farmers' Bulletin 1477. pp. 1-12. 1926.

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PATENTS

RELATING TO PEST CONTROL

BY

DR. R. C. ROARK

U. S. Department of Agriculture

2,431,672 (Dec. 2, 1947; appl. Nov. 14, 1944). TOBACCO CONTAINING TEN PERCENT NICOTINE AS AN INSECTICIDE. Robert B. Arnold, Richmond, Va. — Tobacco By-Products and Chemical Corporation, Louisville, Ky. The patentee claims a process which comprises uniformly mixing finely divided tobacco material with nicotine sulfate in quantity sufficient to supply at least about 10 parts by weight of nicotine expressed as alkaloid for each 100 parts by weight of tobacco material in the presence of at least about 20 parts by weight of water to each 100 parts by weight of tobacco material under neutral to acid conditions and drying the mixture at a temperature of at least about 160° F.

2,431,844 (Dec. 2, 1947; appl. Aug. 3, 1944). PYRETHRIN SYNERGIST. Martin E. Synerholm, Hastings on Hudson, N. Y. — Boyce Thompson Institute for Plant Research, Inc. — An insecticidal composition comprises pyrethrin and the ethyl, n-propyl, isopropyl, n-butyl, allyl, benzyl, cinnamyl, or tetrahydrofurfuryl ester of piperic acid.

2,431,845 (Dec. 2, 1947; appl. Aug. 3, 1944). PYRETHRIN SYNERGIST. Martin E. Synerholm, Hastings on Hudson, N. Y. — Boyce Thompson Institute for Plant Research, Inc. — An insecticidal composition comprising pyrethrin and a compound made by heating together isofrale and the n-propyl, n-butyl, allyl ,cyclohexyl, or benzyl ester of maleic acid.

2,432,007 (Dec. 2, 1947; appl. Sept. 4, 1940). WOOD IMPREGNATING SOLUTIONS CONTAINING HEAVY METAL COMPOUNDS WITH ARSENIC AND CHROMIC ACIDS. Bror Olof Hager, Stockholm, Sweden — Bolidens Gruvaktiebolag, Stockholm, Sweden. — An acidic impregnating solution for preserving wood comprises zinc oxide dissolved in an aqueous solution of arsenic acid and chromic acid, characterized in that when the wood is impregnated with the said solution, the compounds formed by the reaction of the solution with the wood are insoluble in water.

2,432,008 (Dec. 2, 1947; appl. Feb. 20, 1943). PROCESS AND DEVICE FOR FULL-CELL TREATMENT OF TIMBER AND SIMILAR MATERIAL. Bror Olof Hager and Stig Bertilsson Kjellstrom, Stockholm, Sweden. — Bolidens Gruvaktiebolag, Stockholm, Sweden.

2,432,288 (Dec. 9, 1947; appl. Nov. 14, 1945). INSECT POWDER SPRAYER. Abraham Danziger, Brooklyn, N. Y.— Samuel L. Chasin, Brooklyn, N. Y.

2,433,106 (Dec. 23, 1947; appl. April 16, 1942). 2,4-DINITROPHENYL THIOCYANATE AS A FUNGICIDE. Albert L. Flenner and Russel A. Kaberg, Wilmington, Del. — E. I. du Pont de Nemours & Company, Wilmington, Del. — A fungicidal composition comprises a mineral oil solution of 2,4-dinitrophenyl thiocyanate containing a minor amount of an aromatic hydrocarbon solvent.

2,433,267 (Dec. 23, 1947; appl. July 25, 1945). PYRIDINE COMPOUNDS. Wolffe Harry Feinstone, Yonkers, and Harris L. Friedman, New York, N.Y. Pyridium Corporation, Yonkers, N. Y. — The patentees claim compounds having bacteriostatic properties, and having the formula 2-methoxy (or ethoxy or butoxy)ethoxy, 5-aminopyridine and its salts.

2,433,391 (Dec. 30, 1947; appl. Oct. 25, 1945). DICYANDIAMIDE OXALATES. Joseph H. Paden and Alexander F. MacLean, Stamford, Conn. American Cyanamid Company, New York, N. Y. — The oxalate salts of dicyandiamide are useful as chemical intermediates in the preparation of flame proofing compositions, chemotherapeutic agents, insecticides, etc.

2,433,392 (Dec. 30, 1947; appl. Oct. 25, 1947). DICYANDIAMIDE PICRATE. Joseph H. Paden and Alexander F. MacLean, Stamford, Conn. — American Cyanamid Company, New York, N. Y. — The picrate salts of dicyandiamide are useful as chemical intermediates. chemotherapeutic agents, insecticides, etc.

2,433,393 (Dec. 30, 1947; appl. Oct. 25, 1945). DICYANDIAMIDE PICRATE. Joseph H. Paden and Alexander F. MacLean, Stamford, Conn. — American Cyanamid Company, New York, N. Y. — The maleate salt of dicyandiamide is useful as chemical intermediates in the preparation of flameproofing compositions, chemotherapeutic agents, insecticides, etc.

2,433,394 (Dec. 30, 1947; appl. Oct. 25, 1945). DICYANDIAMIDE SULFONATES. Joseph H. Paden and Alexander F. MacLean, Stamford, Conn— American Cyanamid Company, New York, N. Y.

2,433,919 (Jan. 6, 1948; appl. August 21, 1944). RODENT TRAP. Joseph J. Mitchell, Oakland, Calif.

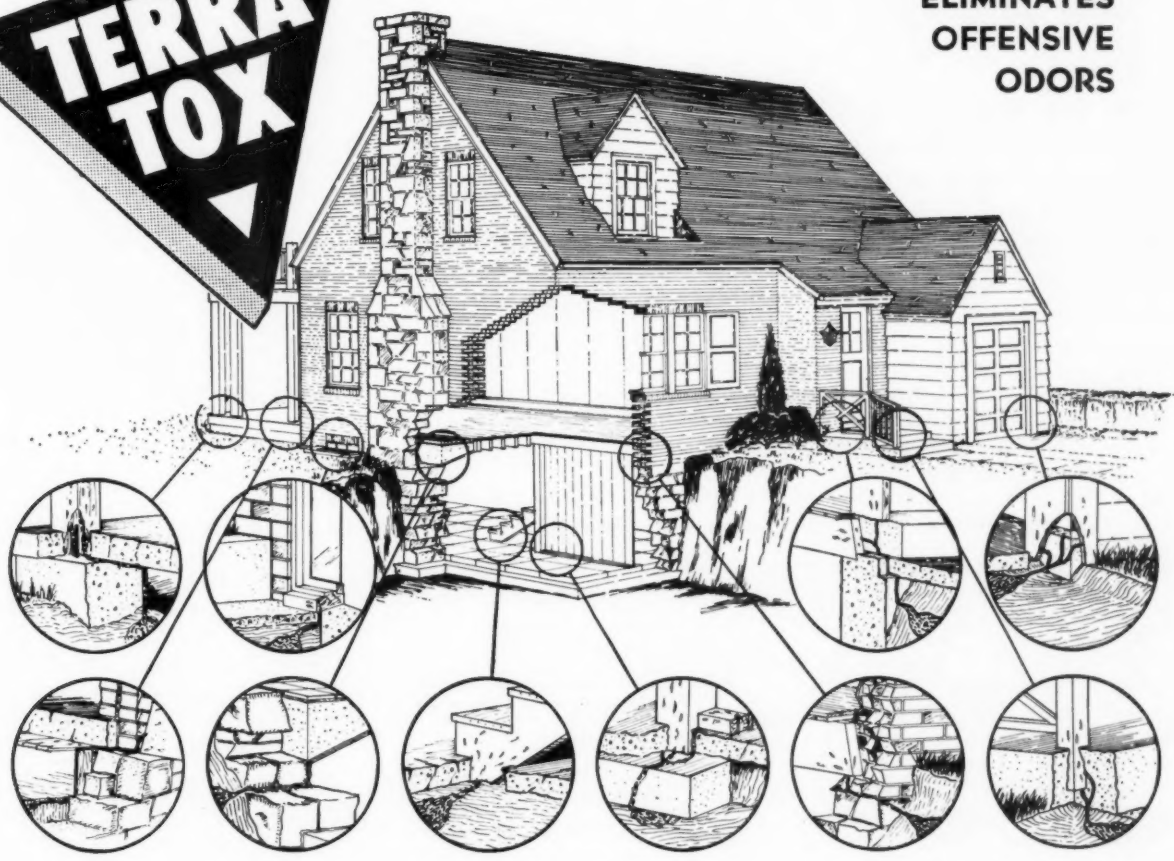
2,433,997 (Jan 6, 1948; appl. Apr. 24, 1944). QUATERNARY AMMONIUM SULFONE HALIDES. Adrian L. Linch, Wilmington, Del. — E. I. du-Pont de Nemours & Company, Wilmington, Del. — These compounds are of value as intermediates for the production of insecticides, fungicides, bactericides, etc.

2,434,031 (Jan 6, 1948; appl. March 23, 1945). ANIMAL TRAP. Joseph S. Adams, Greenwood, Ark.

2,434,099 (Jan. 6, 1948; appl. June 19, 1945). HALOGENOPHENYLTHIO-2,3-EPOXYPROPANES AND HALOGENOPHENYLTHIO-2,3-PROPANEDIOLS. Euclid Wilfred Bousquet, Wilmington, Del., E. I. du Pont de Nemours Company, Wilmington, Del. — The products of this invention are useful as bactericides, fungicides, insecticides and moth-proofing agents.

TERRA TOX for TERMITE CONTROL

ELIMINATES OFFENSIVE ODORS



Vulnerable areas are effectively protected by scientifically formulated TERRATOX . . . . .

TERRATOX comes in two formulations, water and oil soluble, and with the improved formula, your customers may be assured of application without the lingering association of unpleasant odors.

COST ECONOMY: TERRATOX is shipped only in concentrated form—you add your own thinner—this means significant savings in freight charges, and storage costs. Supplied in 1 and 5 gallon cans, and 30 and 55 gallon steel drums.

TERRATOX CONCENTRATES No. 225, No. 235, and No. 245 (oil soluble) are scientifically formulated with a toxic base of pentachlorophenol. Concentrates are so proportioned as to produce 5% of penta in the ready-to-use solution when mixed at the recommended dilution. According to U. S. Government tests (U. S. Dept. of Agriculture Bulletin No. 1911) this solution properly applied should give protection for at least five years.

TERRATOX No. 215 is water soluble and unsurpassed for its outstanding effectiveness in controlling dry wood termites. It has also proved equally effective for ground treatment in the control of subterranean termites.

Wood Treating Chemicals Co.

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New Basis for Termite Control

A Guest Editorial by

George L. Hockenyos

President, National Pest Control Association

TERMITE control work is one of the most important phases of pest control in a large part of the United States and is of overshadowing importance in certain areas such as the deep South and the West coast. At the same time this phase of pest control has at once caused more misunderstanding among of the industry, and between the industry and the public, than any other class of pest control work.

These misunderstandings have developed largely between operators in different parts of the country. Construction is quite different in the several regions of the country with the result that it is hard for the operators to appreciate what those in other parts are up against in treating buildings.

There is also a great variation in the abundance of termites in different regions. A treatment that may be sufficient in one area may not be at all satisfactory in another. In some areas the soil and climate are such that chemicals applied to the soil last for several years while in other areas the same chemical applied in the same amount would not last over two or three years.

Finally, even if we understood each other on all these matters having to do with regional and local variables of construction, soil, climate and abundance of termites, there would need to be a common attitude on the part of the industry toward that customer who may want a sub-standard termite job. There are regions where a standard job may be the only one satisfactory because the termite population (incidence of infestation) may be such that anything less than a standard job is substantially a waste of the customers' money. Let us admit, however, that in areas where the incidence of infestation is relatively low, sub-standard jobs have been giving customer satisfaction for years. We need to recognize this and adopt an industry attitude toward that customer who wants and possibly will be well served by a sub-standard job.

The existing N. P. C. A. standard (1-2-3-3½) has served a splendid purpose. It was fundamentally sound. It was concise. It was simple. It helped focus attention on the basic steps necessary to all sound subterranean termite control work. It brought together certain minimum steps that were a basis for specifications acceptable to the industry and the customer, but it needs elaboration to make it specifically and clearly applicable to any building in any part of the country.

OUTLINE OF THE NPCA STANDARDS FOR TERMITE CONTROL WORK

1. **A standard procedure for each element or detail of construction.**
2. **Choice of chemical based on type of soil and other factors.**
3. **Consideration of the incidence of infestation.**
4. **An industry attitude toward the man who wants a sub-standard job.**

To do this, four steps are proposed. The first is to adopt a detailed procedure for treating each element of construction rather than each type of building. Any building is made up of several details or elements of construction. Common elements are foundation walls, foundation piers, grade entrances, earth-filled porches or terraces, etc. It is estimated that if all the common types of building construction in the country are taken into consideration, it will be found that there are approximately fifty construction details or elements involved. Practically all buildings are made up of some several of these elements or details, regardless of the part of country the building is in. If therefore, we have a set of standard procedures for each of these elements or details of construction, we will thereby have a set of standard procedures for any building anywhere.

The second is to map and consider the incidence of infestation in various regions of the country. The third is to study and take into consideration the chemical retaining power of the basic soil types common in various regions of the country. The final step is to adopt an industry attitude toward the man who wants a sub-standard job.

It will be readily seen that these matters of incidence of infestation and of chemical retentivity of the soil in any given region, or even in a particular locality in any given section, will have a bearing on the question of whether or not a sub-standard job can be justified. It is appreciated that all of this is going to be a big job for the termite control committee which this year has four regional subcommittees. It is believed, however, that the task may well be completed by the time the National Convention is held in 1949 on the West coast. Excellent progress has been made to date and if we consistently take up these matters in their proper order, the job can be done on the scheduled date.

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ALL-PURPOSE EXTERMINATOR SOLUTION HOSE

fully guaranteed

PROVED BY USERS FOR OVER 18 YEARS!

This guarantee and proof of dependable service can only be offered because K. B. Brand is built *especially* for the job. This hose must outwear and outlast *any* comparable product... OR YOUR MONEY REFUNDED!

It's a specially compounded tube and cover of finest quality. It's light and flexible... easy to handle... and is highly resistant to wear and the action of any type of exterminator solution.

Takes high pressure, too, for year after year without weakening. No swelling or seeping of solution... no chance of hose splitting or bursting.

Write at once for prices and descriptive folder on hose and *couplings*.

ALSO ROCK WOOL HOSE AND CYANIDE HOSE

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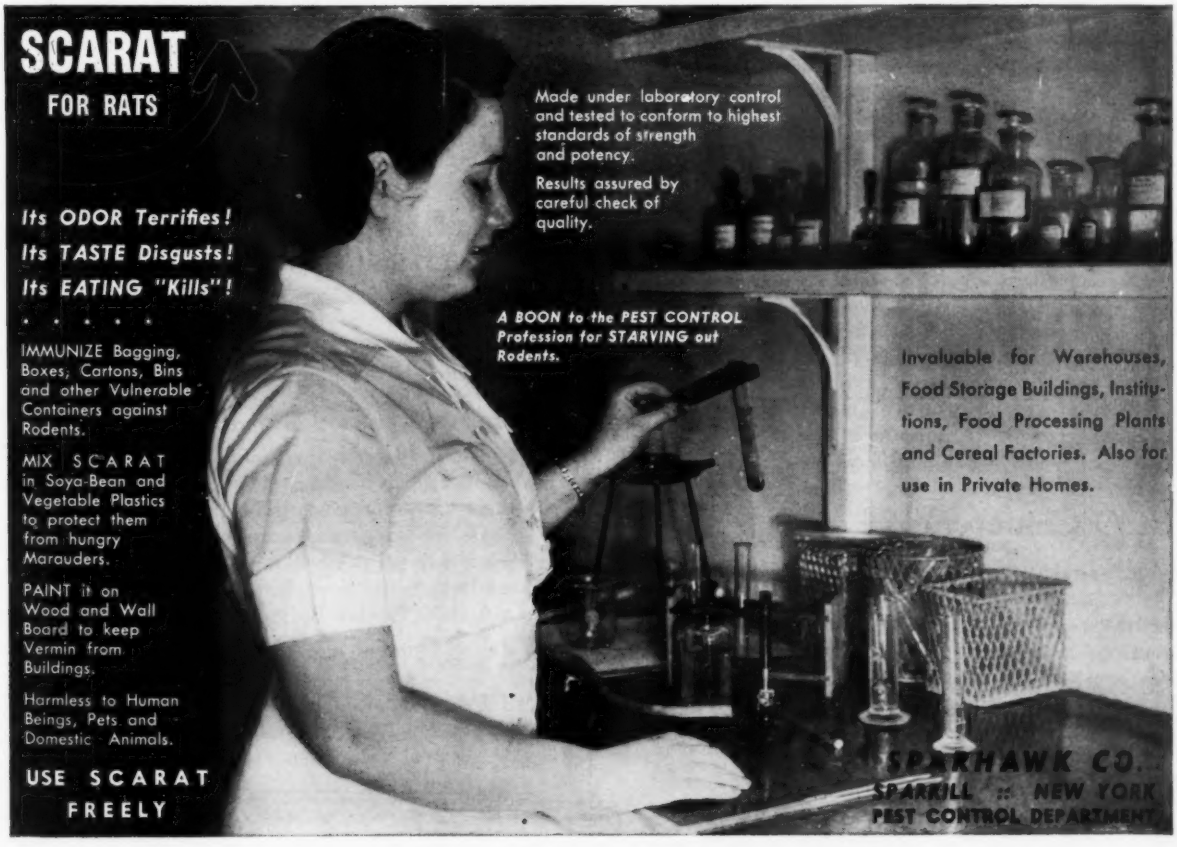
FOR RATS



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Its TASTE Disgusts!

Its EATING "Kills"!

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IMMUNIZE Bagging, Boxes, Cartons, Bins and other Vulnerable Containers against Rodents.

MIX SCARAT in Soya-Bean and Vegetable Plastics to protect them from hungry Marauders.

PAINT it on Wood and Wall Board to keep Vermin from Buildings.

Harmless to Human Beings, Pets and Domestic Animals.

USE SCARAT FREELY

Made under laboratory control and tested to conform to highest standards of strength and potency.

Results assured by careful check of quality.

A BOON to the PEST CONTROL Profession for STARVING out Rodents.

Invaluable for Warehouses, Food Storage Buildings, Institutions, Food Processing Plants and Cereal Factories. Also for use in Private Homes.

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SPARKILL :: NEW YORK
PEST CONTROL DEPARTMENT

COMMENTS by the Editor

Champaign "1080" Incident

THE unfortunate incident at Champaign, Ill. re-emphasizes the extra precautions that must be taken when toxic chemicals are used in pest control work. You will recall that in this case a 14 months old baby boy crawled into the closet of a newly occupied house and smeared 1080 solution from a forgotten cup over his face and hands. The pest control operator who serviced the vacant house before the new occupants moved in was unable to locate four out of 70 cups he had put out. The wife of the family assured the PCO that her husband probably had already destroyed the four cups. Even though care was taken in this instance, one cup obviously was missed. It is always that "one cup" which causes trouble.

From the story carried by most of the country's newspapers the impression was given that whiskey is an antidote for 1080. This is not the case and to date there is no known antidote for this rodenticide. Luckily, the youngster probably obtained a sub-lethal dose of the poison and survived because of that fact rather than because of any benefit which might have been associated with the treatment given.

Every precaution has been taken by the manufacturers to surround this product with rigid restrictions to see that the chemical does not get into the hands of the inexperienced. But they cannot supervise every application or make sure that it is used properly. Souffle cups must be counted when set out, their locations noted, and then. the next morning before operators begin, every one must be picked up. If we can't afford to make this necessary return trip, these toxic chemicals should not be used.

It is reported that some municipalities have under consideration legislation to control by rules and regulations the use of 1080. This kind of community action will spread if these toxic chemicals are not used with the greatest of care. It is far better for the pest control industry to police itself and accept voluntary rules and regulations. These are expected to be announced before long by the National Pest Control Association.

PCO Conferences

WITHIN the last few months, conferences and short courses have been held for pest control operators by cooperating universities in a number of sections throughout the country. Besides giving us the opportunity to talk over similar problems with each other and to renew old friendships, these meetings review some of the principles that may have grown stale and bring us up to date on the latest equipment, chemicals and control procedures.

The value of these conferences is immeasurable and the industry owes a debt of gratitude to the universities and their staffs who give of their time and facilities to raise the standards of our work. In many cases, sessions are held during vacation periods when professors would otherwise have free time. Instead, they set up demonstrations, plan talks and organize a scientific meeting to present the most informative program possible in the time allotted.

Over 3000 individuals have gone to these PCO meetings in the last 12 years, many having attended annually. If you were not one of them, we urge you to attend the next time a university program is planned within convenient traveling distance. You will be well repaid.

"Fly Free" Opportunity

THROUGHOUT the country this summer, the Junior Chamber of Commerce will inaugurate its "Fly-Free America" campaign. Its goal is to make Americans fly-control conscious. Local communities with J.C. chapters will witness dramatic demonstrations of fly control, mainly with DDT. PCOs can benefit from this national project in two ways: (1) they will gain public recognition and profitable publicity by offering to help in their own communities; (2) PCOs who associates themselves with this program stand a good chance of being the men called upon to do paid-for fly control work. Contact your local Jr. C. of C. to find out what plans it has for a fly-free campaign.

Help Us Help You

WHAT time of the year could you use information on rats, flies, cockroaches, mosquitoes, termites, powder post beetles, livestock, insects, mice, carpenter ants, clothes moths, silverfish, fleas or on every other pest you control? What issues do you want discussed by authorities, and when? What kind of illustrations will help most in PCO work.

It is our plan to arrange feature articles so as to anticipate the needs of PCOs and provide them with information on pest problems at the time of the year they are being confronted with those problems. You can help us with this plan if you will send answers to the questions above to PESTS and Their Control, 1900 Euclid Building, Cleveland 15, Ohio.

Every issue of PESTS will include new control developments as soon as they're released, regardless of the month. But with your help, this magazine can become more valuable by publishing specific pest control data when you can use it best. Let us hear from you.

It Pays TO USE ELKAY

- **PARA Deodorizing Blocks**
- **PARA Deodorizing Crystals**
- **PARA Moth Products**
  Vaporizers — Crystals — Cakes
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  Catches Rodents Like Flypaper Catches Flies

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Available in a 12½ to 1 Concentrate

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Insecticides must get into every crack and crevice — under mouldings, behind baseboards, between plumbing — and your sprayer must have complete penetration to reach these hiding places.

MISTMASTER Portable Electric Sprayers give perfect and complete penetration. In this patented sprayer, insecticides are first broken into minute particles by a rotary compressor, then warmed above room temperature, and finally, atomized completely by tremendous pressure at the nozzle.

The result is complete penetration. Insecticide floats longer in the air, settles gradually into every possible opening in complete strength, and does a thorough and effective job of coverage.

Other distinctive features of the MISTMASTER Electric Sprayer are the Automatic Time Switch which can be set for spraying 1 to 24 minutes before shutting itself off, the volume control which regulates the density of spray to suit conditions, and the adjustable spray nozzle which may be directed in any position. Light in weight, built throughout to precision standards, this perfected sprayer is conveniently held in one hand, may be used for both portable and stationary spraying, and will give a life-time of thoroughly satisfactory service with all oil base insecticides.

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ARE PCOs *Too Modest!*

By ELMER A. KUNTZ, Lien Chemical Co.

IN the course of introductory remarks in a "Manual for Rodent Control" published by a large City Health Department in cooperation with several U. S. Governmental Agencies, we find the following:

"For rodent control purposes it is neither logical nor adequate to isolate a single housing unit or commercial establishment from the rest of the community. The smallest unit that can feasibly be isolated is the block or square. All rodent control problems should be approached on the basis of the block or square."

If this be true, then the commercial or professional pest control operator really faces a stupendous task in handling individual jobs in the midst of heavy, surrounding infestations of rats. Yet, the PCO has done and continues to render satisfactory rat extermination service under any and all conditions. Surely, for this outstanding achievement alone, the PCO should cast off his mantle of modesty and bedeck himself in the resplendent attire of The Conqueror. Right? I believe so — sincerely. This being true, who then can estimate the degree of service that the PCO has, and continues to render, in keeping down the troublesome rat population.

How much have the PCO's contributed to the saving of vital and much-needed grains and other valuable foodstuffs? How large would the rat population be without the PCO's services? Commercial Pest Control services go on day and night, every day of the year, definitely stopping many infestations at their source, thereby preventing their spread to surrounding locations. Undoubtedly, in my estimation, the combined total activities of the PCO's have accomplished more in actual rat eradication than all community "drives," "campaigns," "projects" or what have you. This is not to belittle these attempts at community control. Such efforts are usually attended by much fanfare and publicity, whereas the PCO's efforts go practically unnoticed, unappreciated and unsung.

So little publicity do we receive that we are in most instances, unthought of and not even consulted when community or area rat extermination "drives" are contemplated. Yet we *are* experts in our field. We *do* contribute steadily and proficiently in combatting the ever-present rat menace. True, we are compensated for our efforts on individual jobs but we are rarely called upon for consultation, advice or participation in area rat control efforts. In other words, the Doctor is ignored in cases of extreme illness and reliance is placed in patent medicine cures. Is this our fault? I believe it is. We *have* been too modest, to the extent that we are either practically unknown or have not engendered that degree of confidence that would automatically bring us to mind in cases of severe "illness."

So far, I have confined my remarsk entirely to the rat situation. This, of course, includes mice.

But what about the other fields where our efforts are also a distinct contribution to grain-saving and other phases of public health and welfare? Destruction of beetles, weevils and other grain-destroying pests in granaries, warehouses, storehouses and food establishments of all kinds. Who can estimate our contribution in these fields in dollars and cents — or tons?

Termites, farm and garden pests — who can estimate the value of the PCO's services in the control of these pests?

Now that fly and mosquito control is an established fact, what is our contribution to the general public health and welfare in this field?

Cockroaches — all kinds — how many millions of these do we destroy annually?

Moth and carpet beetle damage —how much have we reduced this?

Ants — how many of these armies have we met and destroyed?

How many flea bites did we eliminate?

How many additional hours of sleep have we contributed by elimination of bedbugs?

How many more contented cows are there by reason of our elimination of annoying and even deadly pests?

Horses, hogs, sheep, cats, dogs — how many of these lead healthier and more contented lives by reason of our services?

Think it over!

How much have we contributed in the over-all picture to public health?

How much have we contributed to public welfare?

How much have we contributed to saving of grain and other foodstuffs?

How much have we contributed to lessening of food contamination?

How much have we contributed to lessening of property destruction?

How much have we contributed educationally?

How much?

Are we *too modest?*

I'll say we are!

MUTZ PRACTICES LAW

Anton B. Mutz, formerly of the U. S. Department of Agriculture, Insecticide Division, entered his own law practice in Chicago recently. He will specialize in matters pertaining to the Federal Insecticide, Fungicide and Rodenticide Act and the Federal Food, Drug and Cosmetic Act. His office is at 111 W. Monroe St., Chicago 3.

PUT 'EM ON THE Spot

use NEOCID DDT COMPOSITIONS

Roaches, bedbugs, fleas, mosquitoes haven't a chance when you—

***Dust with* NEOCID A-10** — a ready-to-use DDT powder

***Spray with* NEOCID D-30** — after dilution with deodorized kerosene

These highly effective formulations were developed by Geigy Company, *"Originators of DDT Insecticides."* They are backed by 9 years of experience in DDT compounding and application.

If your local dealer doesn't have these NEOCID* DDT Compositions, just send us his name and address.

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Rodent Seed, Ant Jelly, Arsenic, Carbolic, Pyrethrum, Cresylic, Red Squill, Derris Powder, and other effective chemicals that do a thorough job for the Pest Controller. The quality of CERTOX products remains unaffected by the national emergency. Prices, too, are near normal.

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MM&R DEODORANTS AND PERFUMING MATERIALS

Scientifically perfected by specialists in the art of making pest-killers easier to sell — by making them pleasanter to smell.

If your problem is perfuming or deodorizing (with cost a prime factor), MM&R CAN BE OF SERVICE TO YOU. Send us a small sample of your un-deodorized or un-perfumed product. Our laboratories will work out an effective neutralizer that fits your budget.

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PCO NEWS...

Denver City and County Hold Rat Classes

A rodent control training program for pest control operators and public health personnel was held recently by the Denver city-county health department in cooperation with Griffith Opportunity School.

Discussing every phase of a well-organized rat control program, these afternoon and Saturday morning sessions were attended by 41 Denver citizens, each of whom received certificates of attendance at the conclusion of the course. They were:

George Leachman, D. H. Duffield, Denver Pest Control Co.
B. S., Maurice and Julian Oser, Oser Exterminating Co.
Everett Knox, Ace High Exterminating Co.
C. B. Morgan, Roy Phillips, Reliable Exterminating Co.
William and Richard Anger, Odorless Exterminators
C. B. Batchelder, D. R. Cowgill, C. B. Batchelder Co.
Frank Palmer, Ardee Maintenance Co.
W. B. Lowery, H. R. Worsham, Lowery Exterminating Co.
Lewis Dodson, J. Robert Cameron, Charles C. Scoles, James I. McCave, Allen Ashcraft, Charles Tafoya, Jesse Mays, Henry Jennings, T. M. Chambers, C. E. Fuller, Z. D. Havens, Morey Kartus, and Joseph Carroll, Denver City Health Dept.
K. W. Lloyd, George Schlitt, Colorado State Health Dept.
J. J. Torpey, T. H. Becker, Frank Walton, and William Beitz, Denver City Highway Dept.
Fred Harmston, USPHS, Salt Lake City
Howard Tonn, E. T. Wright, USPHS, Denver
Roy Fugate, Donald Spencer, USFWS, Denver
J. E. Lawle, Tri-County Health Dept. Denver
Ted Leisenring, Emily Griffith School of Opportunity

Leo G. Peck, NSSA Pres.-Elect

Peck New NSSA Prexy

Leo G. Peck of St. Louis, Mo., Vice-President of Pecks Products Company, was named president of the National Sanitary Supply Association at their Chicago convention, Leo J. Kelly, Executive Vice-President of the organization announced.

Elected Vice-President was Carl B. Lien, Chicago man, president of Lien Chemical Company, Chicago. Don Peatee of the Mellecroft Company, Toledo, Ohio, was elected Treasurer; Martin J. Peters of New York, was retained as Secretary of the Board.

Over 1500 registered for the meeting held in Chicago's Morrison Hotel on April 18-21.

Heart Fails Putinski

Joseph A. Putinski who operated the City Storage Company at 560 Arch Street, New Britain, Connecticut, died suddenly on March 21st after a heart attack. President of the Connecticut Pest Control Association at the time of his death, Putinski was very active in the affairs of the industry. Quite a few members of the industry attended the funeral service. He was 44 years of age.

PROUD NEW PARENTS

M. M. Reisman of the Stone Chemical Laboratories Co. of Chicago, Illinois, is passing out big black cigars. He and Mrs. Reisman have recently adopted an infant baby boy whom they have named Michael Lee.

J. P. Personnel Changes

According to an announcement by John Powell, president of John Powell & Co., Inc. New York, Harold L. Straube, who has been associated with the firm for the past eight years in technical sales, has been advanced to assistant sales manager. Direction of company sales is in charge of Mr. Powell. Dr. Robert C. Haring, formerly chief chemist, has been appointed director of plant and manufacturing operations. Dr. Haring was formerly a chemical engineer with the National Aniline Division of Allied Chemical & Dye Corp. Morton E. Bador becomes the new chief chemist.

William J. Pollert, associated with Powell for the past twenty years, and a vice-president, has been made director of all export and foreign activities. Channing J. Fredrickson, entomologist, with wide Latin American experience, becomes sales manager of the export department. Kenneth B. Nash has been transferred from the laboratory to technical sales. Dr. Alfred Weed, vice-president, and an officer of the company for more than twenty years, continues as technical director. The firm will complete twenty-five years in the manufacture of household and agricultural insecticide materials this summer at which time an anniversary celebration is slated, according to Mr. Powell.

John Montgomery Dies

John K. Montgomery, associated since 1920 with Theodore Meyer, Est., of Philadelphia, Pa., died during the latter part of February. A graduate of Lafayette College in 1905, he worked with Colgate & Company for three years. He then took the position of assistant chemist with Henry Diston's until joining the Theodore Meyer, Est. "Monty" attended several PCO meetings and always took part in discussions. He did much experimental work with Martin Meyer's dad and helped develop the Ratmire.

HERE'S how to check *RAT ODORS*

IT'S AMAZING!

get "CHEK"

SPRAY OR POUR

SPECIAL . . .
Ask About the
New PER-MO Antu
Rat Bits in Assorted Flavors

Here's a real rat-odor killer. "CHEK" . . . the newest name in deodorants for putrefactive odors is "CHEK" . . . powerful enough to check odors of decayed animal and vegetable matter. "CHEK" can be used

- For mopping floors (particularly wooden or porous floors).
- Cold storage rooms. Garbage cans.
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PER-MO ALSO MAKES PER-MO MOTHPROOF LIQUID . . Fast repeater! Odorless! Packed in Bulk or to your request . . . PER-MO FLAME PROOF LIQUID . . . Approved by Kansas City, Missouri, Fire Marshall. Does not harm fabrics, decorations, etc., that water will not harm. Spray or dip! PER-MO "ANTU" RAT PASTE . . . Prepared ready for use . . . PER-MO "RED SQUILL" RAT PASTE . . . Prepared ready for use. PER-MO RAT BITS . . . Sure death to rats — non-poisonous to humans, pets, domestic animals. PER-MO RAT and MICE LIQUID . . . Two-way sure death to rats and mice.

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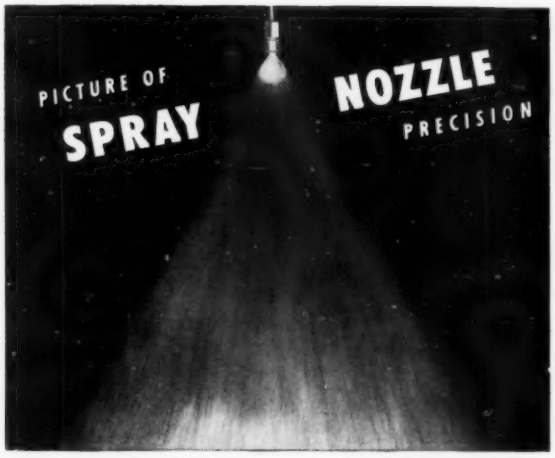

Specialized engineering and precision construction have only one purpose here . . . to give you exact control of spray pattern, distribution, and atomization . . . as well as impact where required, for any given liquid volume and pressure. For your requirements, you will find that Spraying Systems Spray Nozzles can always give you more in performance . . . to improve operations and lower cost. Catalog 22 gives you all the facts.

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WRITE FOR CATALOG 22

THE INSIDE STORY

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SPECIAL COMPOUNDS to your specifications

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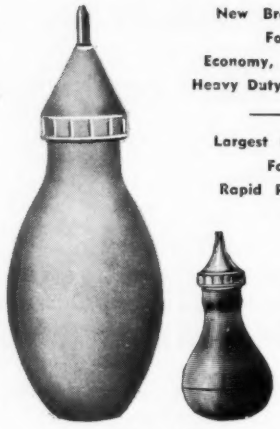

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Full Satisfaction Guaranteed

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No. 1 — 4 oz. — $3.00 Per Doz.
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"More Power for Fly Sprays and Roach Sprays"

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. . . . . RESIPROOFER does not alter the appearance or feel of any woolen fabric.

. . . . . RESIPROOFER combines with animal fibre like a dye—once applied, it protects fabrics even after successive soap and water washings and dry-cleanings.

. . . . . RESIPROOFER is odorless, fast to perspiration, light, and cannot be worn or brushed off.

RESIPROOFER is sold only for application by the professional pest control operator. If the possibilities of this mothproofer strike your imagination, just ask for additional information.

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ORGANIZATION NEWS...

Ontario PCA Elects

Third Annual Meeting and Dinner of the Ontario Pest Control Association was held Thursday, March 18th at the Royal York Hotel, Toronto, Canada. The following officers and directors were elected for the ensuing year:

C. E. Ryder, President, Hamilton, Ont.; D. W. Sanderson, Vice-President, Toronto, Ont.; V. F. Prentice, Secretary, Toronto, Ont.; C. L. Bannister, Treasurer, Toronto, Ont.; and the following as Directors:

H. N. Dickinson, Toronto, Ont.
W. J. Westover, Brantford, Ont.
C. M. McCarthy, Toronto, Ont.
R. F. Hamlin, Toronto, Ont. and
H. R. Corbett, Past President, St. Thomas, Ont.

Retiring President, Harold Corbett, gave a review of the activities of the Association during his term of office and called on all members to assist in promoting further cooperation and interest of the various government health agencies in their pest control work. Special emphasis was laid on the serious and growing problem of the rat menace.

Report of the plans made for the National Pest Control Association's 16th Annual Convention to be held in Toronto next October

(Continued on Page 45)

N. E. PCA Tribute

A joint meeting of the New England PCA and Connecticut PCA was held in Springfield, Massachusetts on March 24th with a special banquet to pay tribute to Charles Pomerantz. A beautifully enscribed certificate was presented to the guest of honor. It read:

In veneration of the Pioneer Spirit
which decrees the destiny
Of our Country and our Civilization
The New England Pest Control Association
is honored to elect to Life Membership
Charles Pomerantz
Co-discoverer of the disease Rickettsialpox
True pioneer in a modern profession
Living inspiration to his fellows.
Benefactor of humanity.

Matt Russell made the arrangements.

19 Companies Organize Iowa State PCA

Ninteen companies accepted charter memberships to form the Iowa State Pest Control Association during a pest control operators conference held at Iowa State College, Ames, Iowa on April 10th.

An excellent all-day program was planned by Harold Gunderson, Iowa State Extension Entomologist, which was opened at 9:30 a.m. with presiding chairman, Dr. H. M. Harris, State Entomologist, greeting the gathering and stating the purpose of the meeting. NPCA Secretary, William O. Buettner, then gave a detailed report of the Purdue Conference and Dr. C. H. Richardson, Iowa State Professor of Entomology, followed with a talk on New Insecticides for Pest Control. Rat and fly control in statewide pest control programs were discussed by Carl C. Potter, Iowa Dept. of Health and Harold Gunderson, respectively. Luncheon was served in the Memorial Hall.

William O. Buettner and Harold Gunderson presided over the afternoon business session which adopted an amended constitution and elected the following officers: Joe Robar, President; C. L. Brookstra, Vice-President; and Vern Walls, Secretary-Treasurer. It was agreed that charter memberships would be accepted until June 1, 1948, but the following firms joined at the end of this part of the conference:

A-I Exterminators Inc., S. F. Stuabaugh, Davenport
Industrial Pest Control Co., Inc., John P. Linn, Omaha, Nebraska
Waterloo Exterminating Service, Rhea F. Du Bois, Waterloo
Franks Exterminator Service, F. E. Bramhall, Ottumwa
F. C. Meyer, Sioux City
Graber Exterminating Company, Des Moines
Smith Products, Council Bluffs
Ralph's Rat Kill Company, Council Bluffs
O. D. Dennis, Davenport
Brookfield Pest Control Co., C. L. Brookstera, Wm. W. Lustfield, Davenport
Brookfield Pest Control Co., W. E. Otto, Burlington, Branch.
Brookfield Pest Control Co., Robert E. Murrison, Cedar Rapids, Branch.
Modern Pest Control Service, Vern Walls, Cedar Rapids, Iowa
Modern Pest Control Service, Vernon Iiams, Waterloo, Branch
Robar Pest Control Company, Joe Robar, Sioux City
Hiland Fumigators, F. M. Michils, Des Moines
Hawkeye Exterminating Co., Inc., J. G. Lipshie, Des Moines
Mississippi Valley Pest Control, Ralph H. Potter, Dubuque
The Antimite Termite Co., Chas. R. Zilm, Des Moines

Harold Gunderson was granted an honorary membership as a token of appreciation for his work in forming this association.

Next meeting of this Iowa State group is scheduled for 9:30 a. m., June 5th at the Memorial Union Building, Iowa State College in Ames.

Arkansas PCA Officers

New officers for the Arkansas Pest Control Association are as follows: President, J. Harvey Hewitt, Hewitt Pest Control Co., Pine Bluff; Vice-President, R. G. Curry, Pine Bluff Termite Co., Pine Bluff; Secretary-Treasurer, Carl L. Whitsin, Orkin Exterminating Co., Inc., Little Rock; and Directors, Wordie Evans, Evans Laboratories, Inc., Little Rock; Delton Mills, Mills & Mills Exterminating Co., Texarkana. Mills was carried over from last year being elected for two years.

Indiana PCOs Revise

The Indiana PCO Assn. held its business meeting April 5 at the Union Hall of Purdue University with vice-president Charles Partlow acting as president. Harold J. Jennings of Chicago, well known for his NPCA work, talked on "Exterminators of the past and PCOs of the present." Bill Buettner and Dr. J. J. Davis assisted in revising this groups Constitution and By-laws. Next meeting will be held July 10th at South Bend.

ONTARIO PCA ELECTION
(Continued from page 44)

was made by Victor F. Prentice, Local Chairman. He stressed the importance of every member doing his utmost to help make this the best convention possible and a really worth while event for their American cousins.

The Annual Dinner followed the business meeting, with W. S. (Bill) Bomby as host and toastmaster who gave a good account of himself with some of his inimitable Scotch stories. After a short program of music and other entertainment, Guest Speaker Dr. A. W. A. Brown, Associate Professor of Zoology and Applied Biology, The University of Western Ontario, gave an informative and interesting talk entitled "Pest Control and the Balance of Nature." Brown pointed out that the rapidly increasing knowledge of production of residual weapons in insecticides may prove to be a two edged sword inasmuch as beneficial insects are being killed along with those harmful to man.

The following PCO's, allied members and guests were present:

Dr. L. A. Clarke, Hamilton Medical Officer of Health
W. L. Smith, Province of Ontario Department of Health
Prof. R. Ozburn, Ontario Agricultural College
A. E. Pointon, Supt. of Sanitation, City of Toronto Health Dept.
Ray Heath, City of Toronto Health Dept.
A. L. Smith, City of Toronto Health Dept.
F. Belfrey, City of Toronto Health Dept.
R. M. MacPherson, City of Peterboro, Health Dept.
G. C. Charlton, North York Health Dept.
L. C. Hancey, East York Health Dept.
E. Taylor, City of Brantford, Health Dept.
C. Copeland, Dominion Dept., of Agriculture, District Inspector
S. O. Baker, Bikoe Manufacturing Co., Ltd., Toronto
C. L. Bannister, Acme Exterminating Co., Toronto
Wm. Bartie, Ocean Chemicals Ltd., Toronto
V. L. Bartram, Monsanto (Canada) Ltd., Toronto
Jos. Bernstein, Ocean Chemicals Ltd., Toronto
W. S. Bomby, Ocean Chemicals Ltd., Toronto
G. Clark, Ocean Chemicals Ltd., Toronto
T. Brioux, Basic Chemicals Co., Toronto
J. Brown, A B C Pest Control Co., Toronto
W. C. Brown, A B C Pest Control Co., Toronto
C. S. Burton, Burton Pest Control, Kingston
T. S. Chambers, Bikoe Manufacturing Co., Ltd., Toronto
C. M. McCarthy, Bikoe Manufacturing Co., Ltd., Toronto
A. Thompson, Bikoe Manufacturing Co., Ltd., Toronto
H. R. Corbett, C & C Products, St. Thomas
H. N. Dickinson, Derpo Products, Ltd., Toronto
H. W. Price, P. N. Soden Co., Ltd., Montreal
John Davidson, P. N. Soden Co., Ltd., Toronto
E. J. Gentle, Gentle Pest Control Service, Hamilton
R. F. Hamlin, Fairview Chemical Co., Toronto
B. J. Harpel, Vermex Chemical Co., Ltd., Toronto
C. Johnson, Kitchener Pest Control, Kitchener
V. F. Prentice, Bikoe Manufacturing Co., Ltd., Toronto
C. Raymond, Reliable Exterminators Ltd., Toronto
D. W. Sanderson, Reliable Exterminators Ltd., Toronto
C. E. Ryder, Pest Control Technicians Ltd., Hamilton
Frank Richardson, Toronto
J. H. Trotter, Natural Products Corp., Toronto
Chas. Williams, Alpha Chemical Co., Toronto
E. H. Wolfe, Standard Chemical Co., Ltd., Toronto
W. J. Westover, Herbicide Chemical and Spraying Co., Brantford

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For many years, LARVACIDE has been winning friends among PCO'S . . . and making enemies of pests. With LARVACIDE, you have the penetrating power so necessary for clothes moth fumigation. On industrial jobs it controls flour moth, granary weevil, tobacco beetle and drug store beetle, including larvae and egglife. Unexcelled for rats. Brings them out of their hiding places to die WITHOUT carcass nuisance. Proven information on LARVACIDE and the MUL-T-VAPOR AEROSOL DEODORIZER on request.

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Group picture of N. Y. State PCA Cornell Short Course, March 29-30

N. Y. STATE PCA RE-ELECTS ALL AT CORNELL MEET

During the short course held at Cornell University with the New York State Pest Control Association on March 29th and 30th, an annual meeting of that association was held in which all incumbent officers were re-elected a second term. They are: I. B. Carncross, president; George W. Dummitt, vice-president; Donal H. Lewis, secretary-treasurer; L. A. Moore, H. S. Lewis and Harry Linindoll, directors.

Thirty-two representatives of nineteen New York state firms attended this first annual pest control conference which covered discussions on insecticides, rodent, mosquito, fly and household insect control and problems facing the pest control operator today. Program was under the direction of Dr. Charles E. Palm, Cornell Entomology Department and included speakers from research fields and industry.

The annual banquet was held at Joe's Restaurant, with Harry Linindoll as toastmaster and President Carncross as principal speaker. William O. Buettner, Executive Secretary NPCA, was honored guest during the conference.

Registration for this Cornell conference was as follows:

William O. Buettner, National Pest Control Assn., Brooklyn
Dr. Chas. Palm, Cornell Univ., Ithica
Dr. William J. Hamilton, Jr., Cornell Univ., Ithica
Dr. L. B. Norton, Cornell Univ., Ithica
Dr. J. E. Dewey, Cornell Univ., Ithica
Dr. D. L. Collins, Office State Entomologist, Albany
Dr. R. W. Leiby, Cornell Univ., Ithica
Dr. Robert Matheson, Cornell Univ., Ithica
Dr. L. A. Carruth, Geneva Experiment Station, Geneva
Dr. Watkins, Cornell Univ., Ithaca
Dr. H. H. Schwardt, Cornell Univ. Ithaca
I. B. Carncross, Syracuse Chemical Co. Syracuse
George Dummitt, Arrow Exterminating Co., Syracuse
Donald H. Lewis, Rose Exterminator Co., Rochester
Harry Linindoll, Albany
L. A. Moore, L. A. Moore & Co., Inc., Utica
C. W. Bohman, Bohman Bros. Inc., Rochester
Walter Blank, Abalene Pest Control Service, Poughkeepsie
Kenneth D. McLeod, McLeod Industrial Fumigators, Buffalo
John McMahon, McMahon Brothers, Binghamton
E. J. Browne, County Chemical Co., Newburgh
D. Norwood Hedlund, Hydro Fumigating Co., Jamestown
Milton Hedlund, Hydro Fumigating Co., Jamestown
H. L. Clarke, Clarke Chemical Co., Utica

(Continued on page 50)

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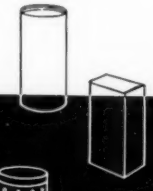

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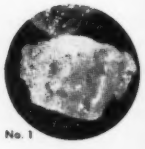
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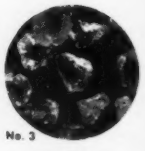
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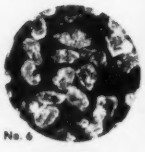
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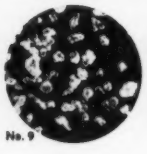
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Phosphorus, however, remains basic in the compound because it is the most toxic chemical used in pest exterminating, being more toxic than arsenic, strychnine or thalium. Approximately one-tenth of a grain will kill a rat. Phosphorous is a slow poison, taking from 6 to 18 hours to kill. Due to its slow but positive action, the rat succumbs to this poison. He becomes very uncomfortable and, seeking fresh air and water, in most cases, leaves the premises and dies in the open.

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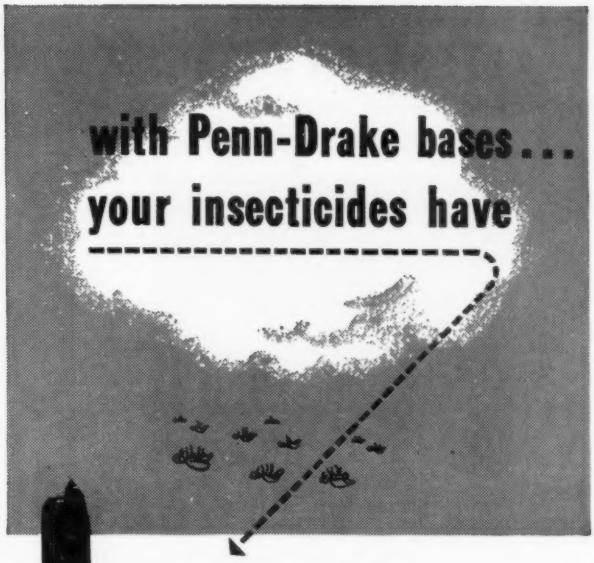

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penn-drake **SUPER-SOL**

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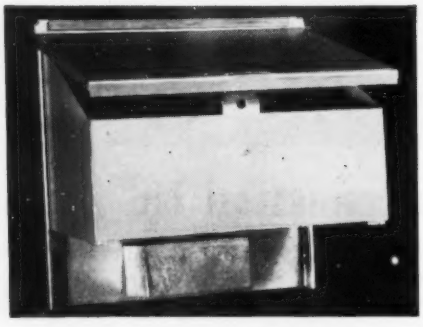

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N. Y. PCA ELECTS ALL

(Continued from page 46)

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Donald McLeod, McLeod Industrial Fumigators, Buffalo
William Viel, City Pest Control Co., Syracuse
Robert Small, Small's Control System, Syracuse
James Keady, Abalene Pest Control Service, Rochester
Melvin Belair, Abalene Pest Control Service, Watertown
Nick Kunz, Abalene Pest Control Service, Auburn
Fred Williams, Abalene Pest Control Service, Binghamton
Tillie Moore, Abalene Pest Control Service, Johnson City
Don Osborn, Arrow Exterminating Co., Syracuse
Don Wittenbeck, Arrow Exterminating Co., Syracuse
Walter Spratt, Arrow Exterminating Co., Ithaca
A. M. Zipser, Industrial Fumigating Co., New York
Hugh Remington, Vasco Exterminating Co., Elmira
Ernest Falke, A. B. C. Exterminating Co., Ithaca
George Dirks, student
R. H. Washburn, student
C. Y. Chow, student

New USDA Termite Bulletin No. 1993

Farmers' Bulletin No. 1993, entitled, "Decay and Termite Damage in Houses," is a booklet every pest control operator interested in termite work should have. It can be obtained by sending 10c in coin to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. This bulletin and Farmers' Bulletin No. 1911, entitled, "Preventing Damage to Buildings by Subterranean Termites and Their Control," also 10c, are the government's official recommendations to the public.

"Decay and Termite Damage in Houses" is well illustrated with right and wrong control procedures. It contains discussions on these subjects: Causes of damage; General safeguards; How to safeguard woodwork close to the ground; How to safeguard parts of houses exposed to rain; Using new types of building material; and Care of houses.

It is recommended that termite operators understand fully the contents of this new bulletin and Farmers' Bulletin No. 1911.

GIDDINGS JOINS JENNINGS

Smithereen Exterminating Company, Chicago, Ill., announces the appointment of Keith Giddings as Technical Director of their Service Department.

Giddings, a graduate of the School of Entomology of Kansas State University with degrees in Sanitary Engineering and Entomology, will work as assistant to H. E. Jennings.

NEW RODENTICIDE

Velodent Products Mfg. Co., Inc. of New York City announce their new VELO Rat Paste. It is said to be the first complete bait with Antu in a tube. Already combined with an acceptable rat food, VELO is sold as a complete rat bait which can be used alone and is available in collapsible tubes.

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WEDDING BELLS

Ada Williams, of Ada Williams Pest Control, 11369 Chenault St., West Los Angeles, was married to Robert Forrest at the Williams home on April 7th.

POWDER-POST BEETLES

(Continued from page 32)

Snyder, T. E. and R. A. St. George. Determination of Temperatures Fatal to Powder-post beetle, **Lyctus palicollis** (Leconte), by Steaming Infested Ash and Oak Lumber in a Kiln. Jour. Agri. Res. 28:1033-1038. 1924.

Tooke, F. G. C. and M. H. Scott. Wood Boring Beetles in South Africa. Preventive and Remedial Measures. Union of South Africa Dept. of Agriculture and Forestry. Bulletin No. 247. (Entomology Series No. 14.) Pretoria. 1944.

Here's how Tarpaulin Fumigation protects bagged and packaged foods

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